



108 Port InfiniBand QDR Switch Platform User Manual

PN: MIS5100Q-3DNC

Rev 1.7

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QDR InfiniBand Switch Platform User Manual

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Revision History

Table 1 - Revision History of this User's Manual

Revision	Date	Details
1.7	May, 2011	Added last page with barcode Removed "InfiniBand Fabric Initialization and Management" Updated Fabric Management Software Section
1.6	Oct. 2010	Added air flow direction
1.5	Oct. 2010	Removed Chassis Rails from installation Kit and Installation instructions. Fixed Port Connector LED Assignment
1.4	Aug. 2010	Added QSFP Cable Power Budget Classification Added weight lifting warning Added "Remove all protective plastic film from all sides and top of the chassis." Added FCC Statement 15.19 Added CoG and Max heat to Specs in Appendix A
1.3	July 2010	Fixed graphic call out in Figure 4.
1.2	July 2010	Added note that the initial configuration must be performed on all of the management modules in the chassis. Master before Slave.
1.1	June 2010	Added section on getting licenses Added note r.e. Wait 1 minute before putting in a Hotswap part. New power numbers Added appendix Calculate Custom chassis weight Added appendix Calculate Custom chassis power Added a note that if EFM is updated and the FW image in the leafs and spines is earlier than the minimum that the new version of EFM can work with then the chassis management system will require ~45 minutes to update all of the FW images in the leafs and spines. Replaced Directive WEEE graphic Added a note "...switches must be configured to 10/100M auto-negotiation" Moved Revision above About
1.0	May 2010	Initial release

About this Manual

This manual provides an overview of the 5100 modular InfiniBand chassis switch and guidelines for its operation.

Intended Audience

This manual is intended for users and system administrators responsible for installing and setting up the chassis platform.

The manual assumes familiarity with the InfiniBand® architecture specification.

Related Documentation

The documentation set accompanying the QSFP Chassis InfiniBand Switch platform includes the following:

Table 2 - Reference Documents and Web Sites

Switch Firmware and Firmware Update Tools	See http://www.mellanox.com => Downloads => Firmware Tools. Note that the Switch System described in this manual is based on Mellanox Technologies' InfiniScale® IV switch device.
FabricIT Enterprise Fabric Management Software CLI User's Manual	See http://www.mellanox.com > Products > Management Software Select "FabricIT EFM - InfiniBand Fabric Management" Click "Software and Documentation Download center" select User Manual
IB Switch Platforms Embedded Management Tools Document no. 2141UM	Describes the Embedded Management Tools (EMGT) package, which provides Out-of-Band management capabilities for InfiniBand switches. Available from http://docs.mellanox.com (requires a Mellanox Technologies customer account).



This symbol makes recommendations to the user.



This symbol indicates information that is helpful to the user.



This symbol indicates a situation that can potentially cause damage to hardware or software.



BEWARE! This symbol indicates a situation that can potentially cause personal injury or damage to hardware or software.

1 Overview

This User's Manual provides an overview of the IS5100 QSFP DDR/QDR Modular InfiniBand Switch Platform (known in this document as 'the switch') and its operational environment.

Mellanox IS5100 switch system provides the highest performing fabric solution by delivering high bandwidth and low latency to Enterprise Data Centers, High-Performance Computing and Embedded environments. Networks built with the IS5100 system can carry converged traffic with the combination of assured bandwidth and granular quality of service. Built with Mellanox's 4th generation InfiniScale® IV InfiniBand switch device, IS5100 system provides up to 40Gb/s full bidirectional bandwidth per port. With up to 108 ports in a 6U high form factor, these systems are among the densest switching systems available.

The switch platform comes pre-installed with all necessary firmware for standard operation within an InfiniBand fabric and requires an InfiniBand compliant Subnet Manager running from one of the hosts or the management module of the switch system. An initial configuration procedure should be followed to initialize the switch before connecting it to the network after which normal operation can proceed. (See the installation guide for details regarding the initial configuration) Once connected to the network, the Subnet Management software automatically discovers and configures the fabric and begins utilizing the switch.

It is recommended that the Mellanox OpenFabrics software package be installed on all nodes connected to the switch. The software package provides a subnet manager and network management tools as well as connectivity software for servers and storage, and is available on the Mellanox web site.

Basic installation is covered in **Chapter 3, "Installation" on page 28.**

Hot-swapping components and hardware maintenance is covered in **Chapter 5, "Insertion and/or Hotswap Extraction" on page 50.**

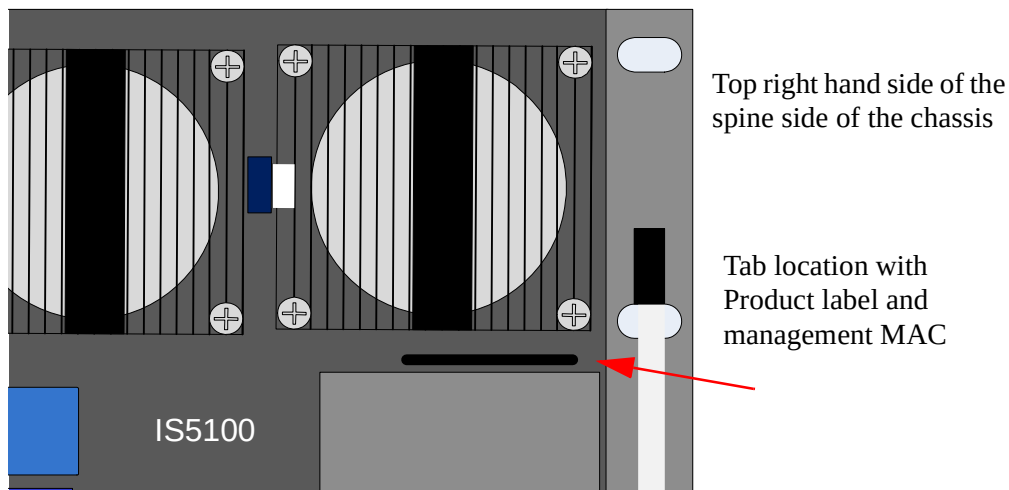
1.1 Product Information

1.1.1 Serial Number and Product Version Information

The serial number, GUID Identifier and product version information are found on the label that is attached to the pull-out tab that is below the Mellanox logo on the spine side of the chassis. FabricIT-CM license is located on the bottom side of the pull out tab.

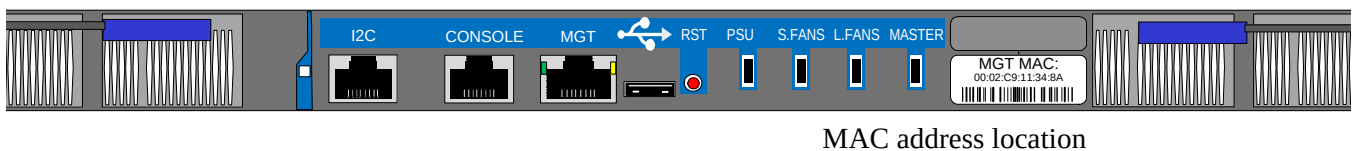
Figure 1: Generic Product Label

This is the System Image GUID according to the IB spec. It is burned on the board which is in the chassis. All the boards and the management SW look for this GUID in addition to their own Node GUID.

Figure 2: Product Label Tab Location

1.1.2 Management Module MAC

Each management module has a label with its MAC address. See below for the location of this label.

Figure 3: Management Module MAC Address Location

Product Physical Specifications and Power

Table 3 - Switch Rack Mechanical and Environmental Requirements (Fully Populated Chassis)

Rack Height Required	Rack Width	Rack Depth	# of leafs / # of Spines	Weight	Power Consumption vs. Supply (108 x QSFP Ports)	Ambient Temp.
6U (265 mm) Plus 1U for the Shelf	19" (EIA-310) (482.6 mm)	25.7" 685 mm	6/3	77kg (170lbs) full configuration 32 KG (71 lbs) empty configuration	Typical: 1333.27W (including QSFP at 2W) Typical:1225.27W (including QSFP at 1W) Typical:1056.81W (passive cables) 3 Power Supplies of 1000W 100-240VAC, 50-60Hz, 6.3-13A	Max: 45°C Min: 10°C

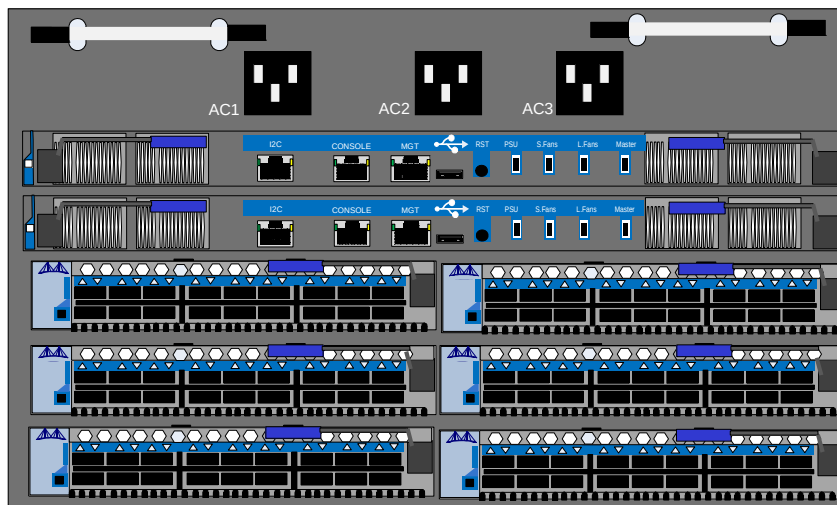
The switch ships in a minimum base configuration plus additional modules depending on the chosen customer configuration. Optional modules include:

- Leaf boards
- Management modules

Figure 4 shows the connector and spine sides fully populated.

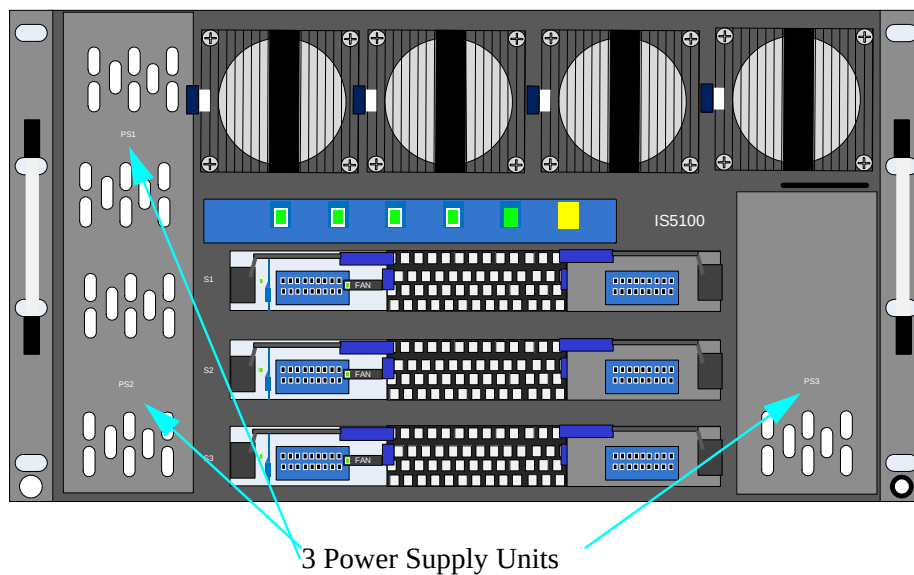
Figure 4: IS5100 Switch Views

Two Management Modules.



Four leaf fan modules on the spine side of the chassis.

Three spine modules on this side of the chassis.



3 Power Supply Units

2 Hardware

Installation Safety Warnings

1. Installation Instructions

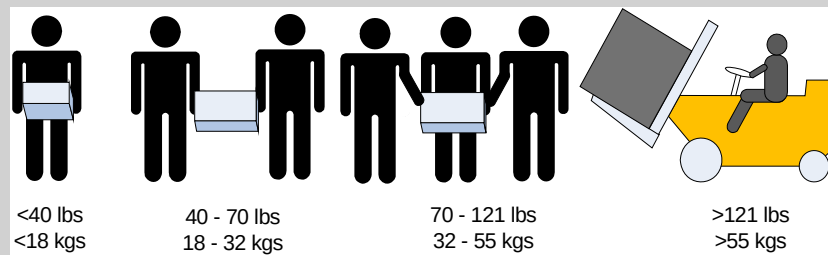


Read all installation instructions before connecting the equipment to the power source.

2. Bodily Injury Due to Weight



Use enough people to safely lift this product.



3. Installation in Restricted Access Location.



This unit is intended for installation in Restricted Access Location.

4. Over-temperature



This equipment should not be operated in an area with an ambient temperature exceeding the maximum recommended: 45°C (113°F). Moreover, to guarantee proper air flow, allow at least 8cm (3 inches) of clearance around the ventilation openings.

5. Stacking the Chassis



The chassis should not be stacked on any other equipment. If the chassis falls, it can cause bodily injury and equipment damage.

6. Redundant Power Supply Connection - Electrical Hazard



This product includes a redundant power or a blank in its place. In case of a blank power supply, do not operate the product with the blank cover removed or not securely fastened.

7. During Lightning - Electrical Hazard



During periods of lightning activity, do not work on the equipment or connect or disconnect cables.

8. Copper InfiniBand Cable Connecting/Disconnecting



Copper InfiniBand cables are heavy and not flexible, as such they should be carefully attached to or detached from the connectors. Refer to the cable manufacturer for special warnings/instructions.

9. Rack Mounting and Servicing



When this product is mounted or serviced in a rack, special precautions must be taken to ensure that the system remains stable. In general you should fill the rack with equipment starting from the bottom to the top.

10. Equipment Installation



This equipment should be installed, replaced, and/or serviced only by trained and qualified personnel.

11. Proper Enclosure



A suitable electrical, mechanical and fire enclosure shall be provided by the end product manufacturer and or the end user.

12. Equipment Disposal



Disposal of this equipment should be in accordance to all national laws and regulations.

13. Local and National Electrical Codes



This equipment should be installed in compliance with local and national electrical codes.

14. UL Listed and CSA Certified Power Supply Cord Leakage >3.5mA



For North American power connection, select a power supply cord that is UL Listed and CSA Certified, 3 - conductor, [16 AWG], terminated with a molded plug rated at 125 V, [13 A], with a minimum length of 1.5m [six feet] but no longer than 4.5m.

For European connection, select a power supply cord that is internationally harmonized and marked “<HAR>”, 3 - conductor, minimum 1.0 mm² wire, rated at 300 V, with a PVC insulated jacket. The cord must have a molded plug rated at 250 V, 10 A.



Warning: High leakage current; Earth connection essential before connecting supply.

15. Add GND connection information



Before connecting this device to the power line, the protective earth terminal screws of this device must be connected to the protective earth in the building installation.

(GND Connection Information):

The building installation shall provide a means for connection to protective earth; and the equipment shall to be connected to that means permanently by a service person.

A SERVICE PERSON shall check whether or not the socket - outlet from which the equipment is to be powered provides a connection to the building protective earth. If not, the SERVICE PERSON shall arrange for the installation of a PROTECTIVE EARTHING CONDUCTOR from the separate protective earthing terminal to the protective earth wire in the building. The equipment shall be installed in area where equipotential bonding exists ((such as a telecommunication centre or a dedicated computer room)

16. Installation codes



This device must be installed according to the latest version of the country national electrical codes. For North America, equipment must be installed in accordance to the applicable requirements in the US National Electrical Code and the Canadian Electrical Code.

17. Interconnection of units



Cables for connecting to the unit RS232 and Ethernet Interfaces must be UL certified type DP-1 or DP-2. (Note- when residing in non LPS circuit)

Overcurrent Protection: A readily accessible Listed branch circuit overcurrent protective device rated 20 A must be incorporated in the building wiring.

18. Hazardous Radiation Exposure

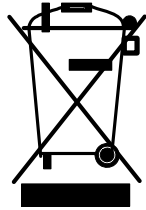


Caution – Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.



CLASS 1 LASER PRODUCT and reference to the most recent laser standards:
IEC 60825-1:2007/03 and EN 60825-1:2007

19. WEEE Directive



According to the WEEE Directive 2002/96/EC, all waste electrical and electronic equipment (EEE) should be collected separately and not disposed of with regular household waste.

Dispose of this product and all of its parts in a responsible and environmentally friendly way.

2.1 LED Status Indicators

The LEDs are placed on the chassis for the convenience of the IT manager.

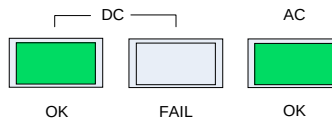


We recommend that all of the chassis sub systems be maintained and managed through the FabricIT EFM management software.

2.1.1 Power Supply Unit LEDs

Each Power Supply Unit has the following indicator LEDs.

Figure 5: Power Supply Unit Status Indications

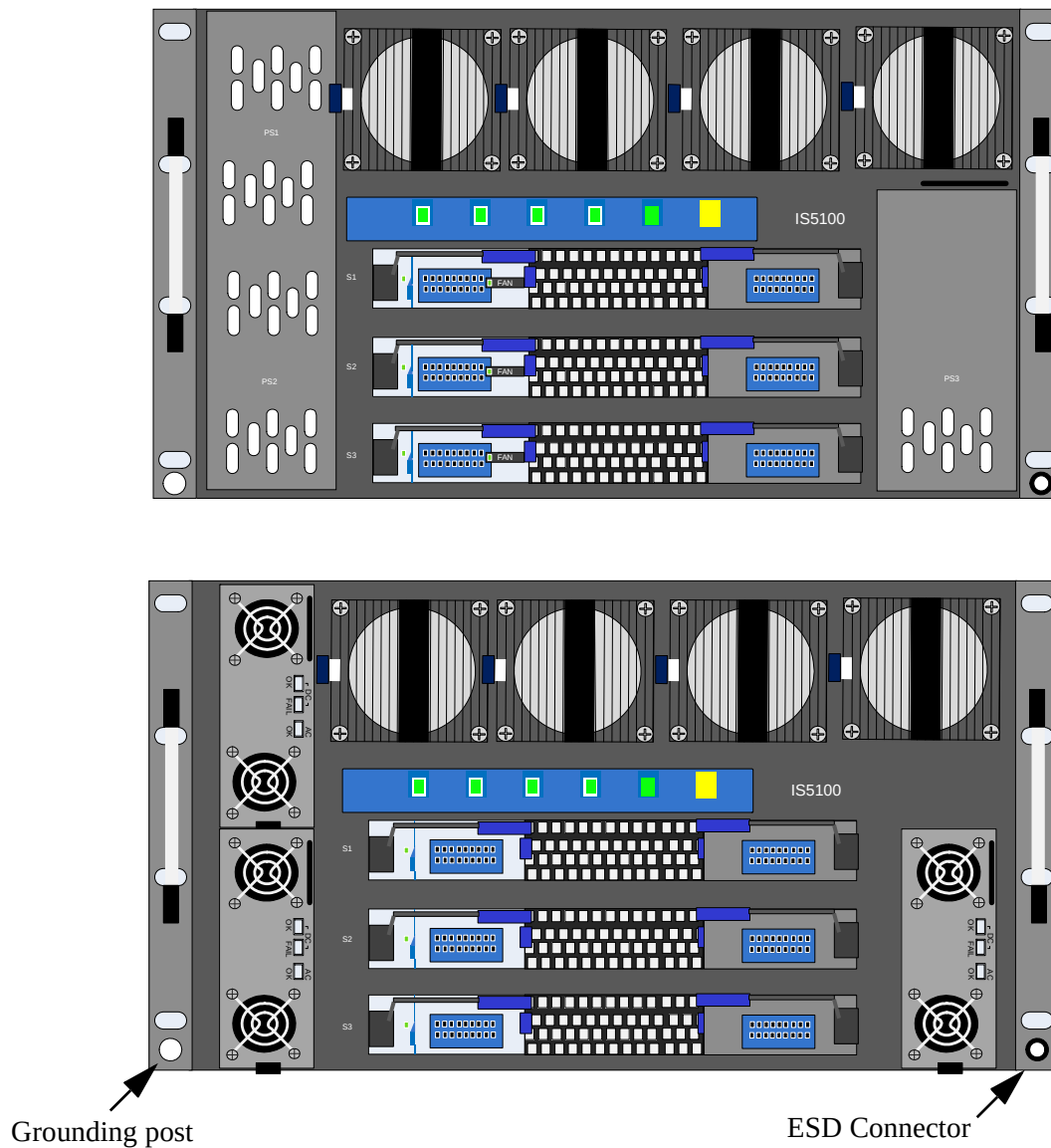


AC – When lit this LED indicates input voltage between 100 and 240 Volts.

DC FAIL – When lit this LED indicates a fault in the power supply.

DC OK – When lit this LED indicates that the output from the power supply is +48 VDC.

Note: The PSUs are on the spine side of the chassis behind two cover panels. The plugs for these PSUs are on the leaf side of the chassis.

Figure 6: PSU Cover On and Off

2.1.2 Leaf Board LED Indicators

Each leaf board has a Status LED on the far left of the leaf. This LED has the following meanings according to the LED status.

Table 4 - Leaf Board Status Indications

	LED Description
Off	No power to the leaf
Solid Green	Normal operation

Table 4 - Leaf Board Status Indications

	LED Description
Flashing Green	Power up in progress
Yellow	Non fatal error
Red	Fatal error

2.1.2.1 Leaf Board Port Connector LED Assignment

Above the ports are two LEDs one for the upper port ▲ and one for the lower port ▼. The following table shows the port status according to the LED indication.

Table 5 - Connector Physical and Logical Link Indications

	LED Description
Off	No power to the port
Solid Green	Logical link up
Flashing Green	Data activity flashing speed $\approx$ data transfer speed
Orange	Physical link up
Flashing Orange	A problem with the physical link

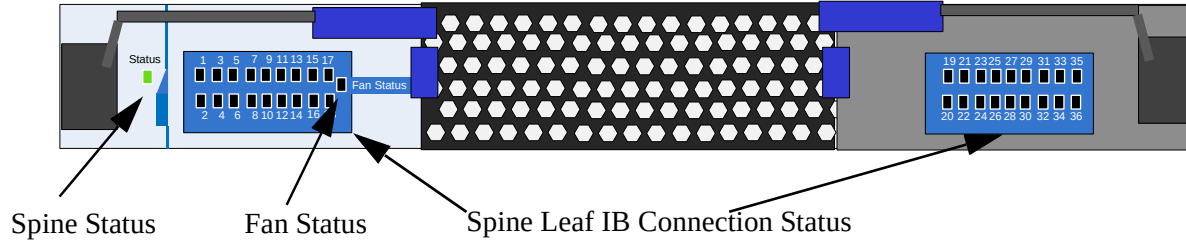


The switch does not provide a visual means that indicates the port speed configuration (SDR, DDR, or QDR) and/or the link width (1X or 4X). The speed and link width configurations can be retrieved using FabricIT management software.

2.1.3 Spine Board LED Indicators

Each leaf board is connected by links to each spine module. Each spine has one status LED for the spine and 36 status LEDs. The 36 LEDs on each spine are divided by the number of leafs and the result (X) is the number of ports from each leaf that is connected to the spine. 3 spines must be installed and working to ensure that full BW exists between nodes. Should a leaf be removed then X number of LEDs will turn off on each of the spines.

The status LEDs for the spine and their descriptions are shown in Table . The LEDs indicate as follows:

Figure 7: Spine Status LEDs**Table 6 - Spine Status LED**

	LED Description
Off	No power to the spine
Solid Green	Spine is up and running
Flashing Green	Spine is powering up
Orange	Non fatal error
Red	Fatal error

The leaf board status on each spine displays the condition of the connection between the spine and each leaf. There is a minimum of one LED per each leaf per each spine. Each spine has leaf status LEDs. The leaf LEDs on each spine indicate as follows:

Table 7 - Spine to Leaf IB Link Status

	LED Description
Off	Link is down
Solid Green	Logical connection
Flashing Green	Data activity
Orange	Physical connection

Table 8 - Spine Fan Status LED

	LED Description
Green	Spine Fan is OK
yellow	One or more of the fans in this spine is not working

2.1.4 Spine Side Panel Display LED Indicators

The spine side panel display has LEDs that show the chassis condition.

Figure 8: Spine Side Panel Display Status Indications

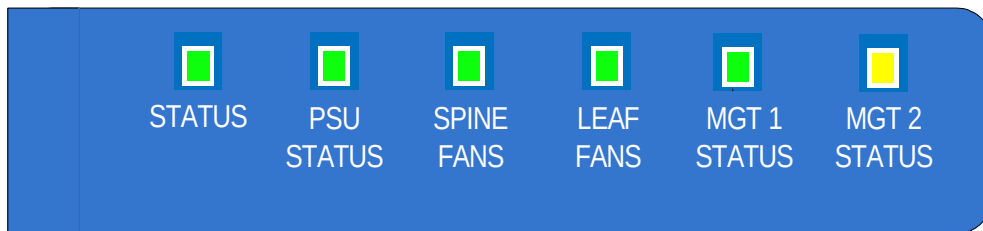
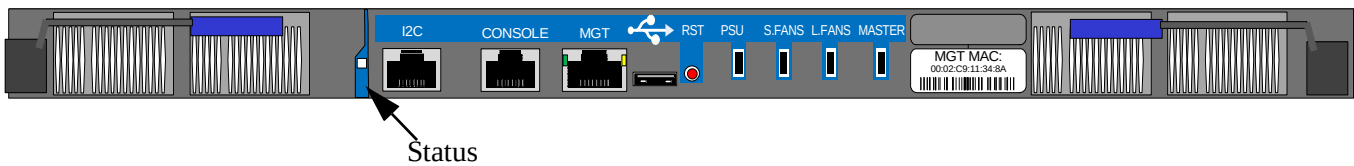


Table 9 - LEDs Display for Normal Operation

LED	Description	Normal State
STATUS	Off = No Power Green = System is up and running. Yellow = System warning. Attention needed (such as overheating). Red = System not operational (Diagnostics fail, CPU hang, HW fail, Overheat-critical) Blinking Yellow = System booting / Restore factory defaults in progress.	Green
PSU STATUS	Off = No power Green = Normal operational Red = PS fault detected. User should check individual power supplies for fault indications.	Green
SPINE FANS STATUS	Off = No power to fan Green = Nominal operational Yellow = Non fatal failure Red = Fatal failure Turn the chassis off and then troubleshoot	Green
LEAF FANS STATUS	Off = No power to fan Green = Nominal operational Yellow = Non fatal failure Red = Fatal failure Turn the chassis off and then troubleshoot	Green
MGT1 STATUS	Off = no power or this management module is not installed Green = Management module is operating as a master Yellow = Management module is operating as a slave (i.e., the other management module is a master)	Green
MGT2 STATUS	Off = no power or this management module is not installed Green = Management module is operating as a master Yellow = Management module is operating as a slave (i.e., the other management module is a master)	Yellow

2.1.5 Management Module LED Indicators

Figure 9: Management Module Status Indications



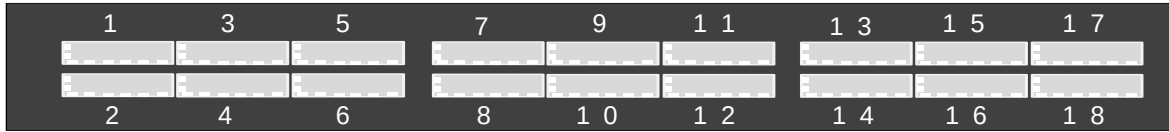
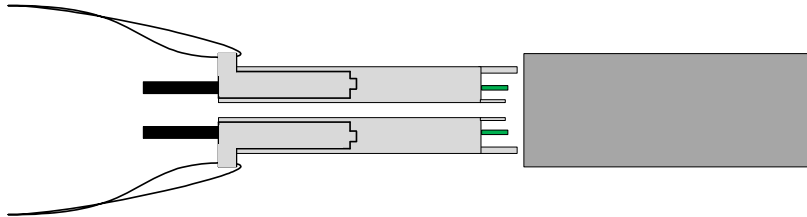
The management module LEDs display the switch system operating conditions.

Table 10 - LEDs Display for Normal Operation

LED	Description	Normal State
STATUS	Off = No Power Green = System is up and running. Yellow = System warning. Attention needed (such as overheating). Red = System not operational (Diagnostics fail, CPU hang, HW fail, Overheat-critical) Blinking Yellow = System booting / Restore factory defaults in progress.	Green
PSU STATUS	Off = No power Green = Normal operational Red = PS fault detected. User should check individual power supplies for fault indications.	Green
SPINE FANS STATUS	Off = No power to fan Green = Nominal operational Yellow = Non fatal failure Red = Fatal failure Turn the chassis off and then troubleshoot	Green
LEAF FANS STATUS	Off = No power to fan Green = Nominal operational Yellow = Non fatal failure Red = Fatal failure Turn the chassis off and then troubleshoot	Green
MASTER	Off = no power or this management module is not installed Green = Management module is operating as a master (i.e., the other management module is a slave) Yellow = Management module is operating as a slave (i.e., the other management module is a master)	Green

2.1.6 Port Connector Interfaces

The connector side of the switch has 6 leaf boards and each leaf board has 18 QSFP ports. The ports on each leaf board are placed in two rows, 9 ports to a row. The ports are labelled as shown in Figure 10. The bottom row ports are flipped from the top row. See Figure 11.

Figure 10: Port Numbering**Figure 11: Top and Bottom Ports**

2.2 Air Flow

These switches come with the air flow pattern of air entering through the spine side and exiting through the connector side.

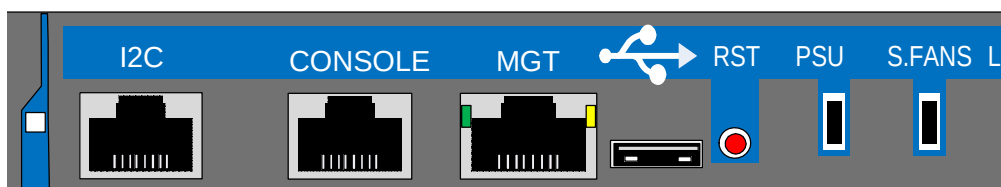
2.3 QSFP Cable Power Budget Classification

All IS5100 QSFP switches are designed for a active cables with a max power per module of 2.0W. This is power level 2 according to the QSFP Public Specification.

2.4 Management Module Interfaces

The switch system requires at least one management module. The management module has five interfaces to connect to the IS5100. They are:

- 1 I2C port
- 1 CONSOLE port – this is an RS232 connector for connecting to a host machine
- 1 MGT – this is an Ethernet connector
- 1 USB port
- 1 RST – reset button

Figure 12: Management Module Interfaces

2.4.1 I2C

This interface is for Debug and Troubleshooting only. This interface is for FAEs only.

2.4.2 CONSOLE

The CONSOLE port is used during the installation process to configure the chassis for remote management. Connect this port to a local host using the harness supplied with the chassis. See the Installation Guide for the initial configuration procedure.

2.4.3 MGT– Management

The MGT port is an Ethernet port for remote management. Any remote terminal connected to the Ethernet can then be used to manage the fabric and chassis.



Each Ethernet connector gets connected to Ethernet switches. These switches must be configured to 10/100M auto-negotiation.



Initial configuration must be done on all of the management modules.

2.4.4 USB

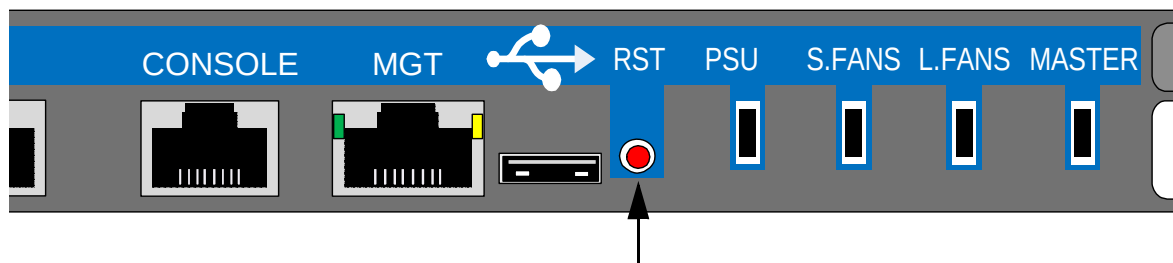
The USB port can be used to upload new SW using any storage device that has a USB connector.

2.4.5 RST – Reset/Restore

There is a Reset/Restore button. This button resets the chassis when the button is pushed. When the button is held down for 5 seconds the chassis is reset and the password is reset to the original default password.



DO NOT use a sharp pointed object such as needle or push pin for pressing the Reset button. Sharp objects can cause damage, use a flat object such as a paper clip.

Figure 13: Reset Restore Button

3 Installation



This chassis can be installed in standard 19" racks that have depths between 650mm and 800mm between the vertical supports of the rack.

Installation and initialization of the chassis is a simple process requiring attention to the normal mechanical, power, and thermal precautions for rack-mounted equipment. Your Chassis will be shipped in two packages one with the all of the leafs (leaf package) that are ordered and an extra management module should it be ordered, and the second package (chassis package) with all of the rest of the parts.

The chassis requires initial configuration to get the chassis and Fabric management up and running through remote management. See the Installation Guide that is packed in the box for the instructions to make the initial configuration.



This unit is intended for installation in a Restricted Access Location. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.

3.1 Chassis Package Contents

The package includes:

20. 1 chassis with the following moduled installed 3 spines, 0 leafs, 1 management module, 4 fans, 3 PSUsIf you wish you may reduce the weight of the chassis by removing all of the spines, power supply units, fan units, and management modules, and put aside for reinstallation after the chassis is installed in the rack.
-
- 1 installation kit
- 1 box containing 3 power cords 125V 10A, C14 to C13, 6 feet long, USA UL Standard and 1 RJ45 to DB9 harness
- 1 cable management kit
- 1 installation guide
- 1 user manual (this document)
- 1 parts list

Before you install your new IS5100 series chassis, unpack the system and check to make sure that all the parts have been sent, check this against the parts list. Check the parts for visible damages that may have occurred during shipping.



If anything is damaged or missing, contact your customer representative immediately.



The rack mounting holes conform to the IEA-310 standard for 19-inch racks. Guarantee proper ventilation, by leaving 8cm (3") of space to the front and rear of the switch. This will ensure proper air flow through the chassis. This is crucial for maintaining good airflow at ambient temperature. In particular, route cables such that they do not impede the air into or out of the chassis.

3.2 Physical Installation



Warning: This equipment is very heavy. Safety is the first concern. The fully loaded chassis weighs ~170 lbs (77 kg). Make sure that proper manpower and equipment is used for transporting and moving the chassis.

The switch platform uses 7U of rack space in a standard 19" rack, 6U for the chassis and 1U for the shelf. The switch ships from the factory with mounting holes on the spine side. There are upper brackets to connect the leaf side to the rack near the top of the chassis. The weight of the switch is supported from underneath the unit by the shelf.

This chassis can be installed in standard 19" racks that have depths between 650mm and 800mm between the vertical supports of the rack. Make sure that a fully populated rack including cables will have sufficient air flow for cooling.



Choose a rack which is able to support the mechanical and environmental characteristics of a fully populated switch chassis.



Mellanox recommends a rack that is at least 80 cm long.

3.2.1 ESD Connection

Before starting any procedure on the IS5100 series Switch system:

1. Put an ESD prevention wrist strap on your wrist, and make sure there is good contact between your body and the strap.
2. Plug the other end of the wrist strap to a valid ground. Make sure that this is a tight fit.

3.2.2 Installation Procedure

3.2.2.1 Requirements

You will need:

- #2 phillips screwdriver
- #3 phillips screwdriver
- a grounding lug
- ground wire to properly ground the chassis



The installation will be much easier with a power screwdriver.



It is recommended to use AWG6 or 4mm diameter wire for grounding purposes.



It is recommended to have at least two people for the duration of the installation procedure. Use a mechanical lift to raise this chassis. If not, use enough manpower to ensure the safety and wellbeing of all of the people involved in the installation.

- Parts included in the installation kit:
- Parts included in the cable management installation kit:

Parts for installing the shelf

- 1 shelf
- 8 of caged nuts
- 8 M6 bolts for the caged nuts
- 2 Shelf rail slides

Parts for installing the chassis

- 2 Chassis rail slides
- 8 sets of caged nuts and bolts
- 2 Flat 4 hole metal spacers
- 4 Handles
- 8 M4 Screws
- 12 Flat head screws
- 8 Allen head screws
- 1 allen wrench

Parts for installing the cable manager

- 1 RH cable holder
- 1 LH cable holder
- 8 sets of caged nuts and bolts

You will need 7U of space in the rack, 6U for the chassis and 1U for the shelf.

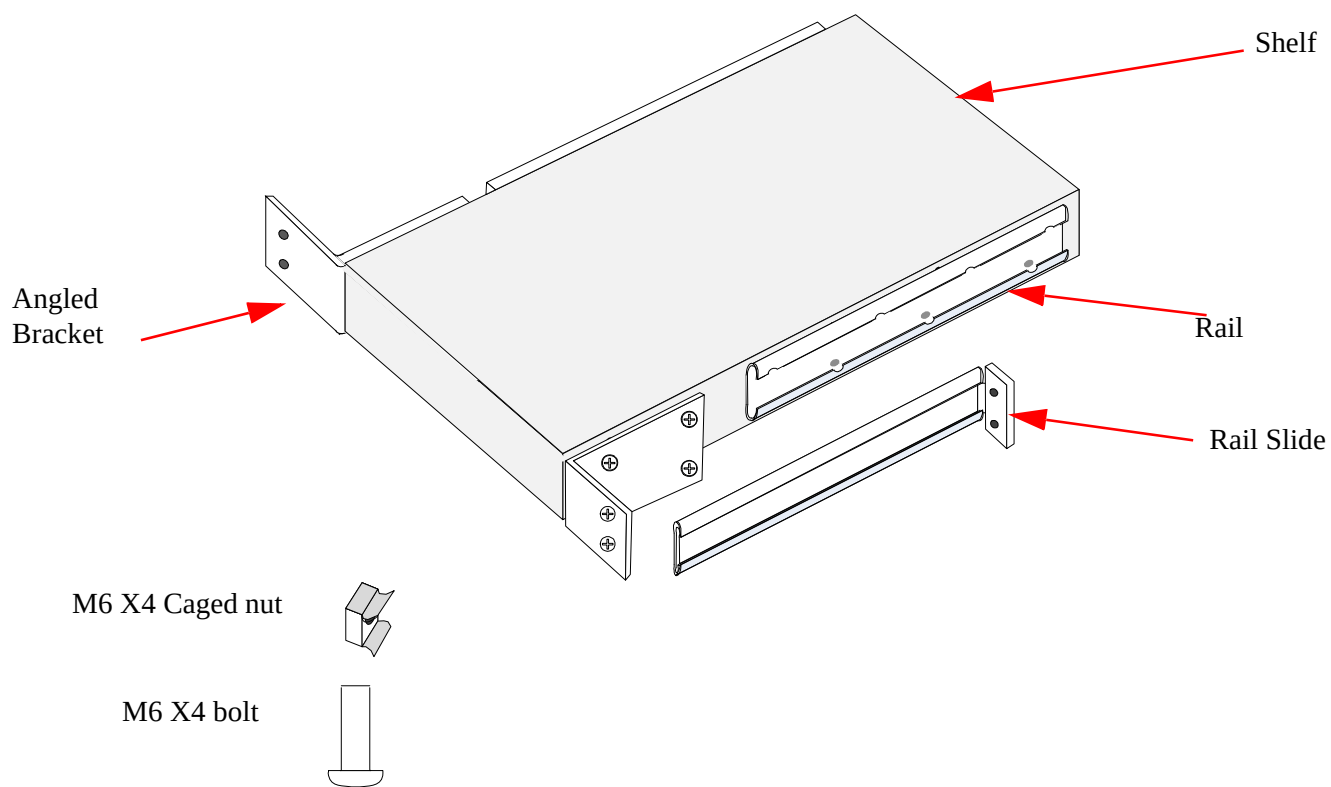
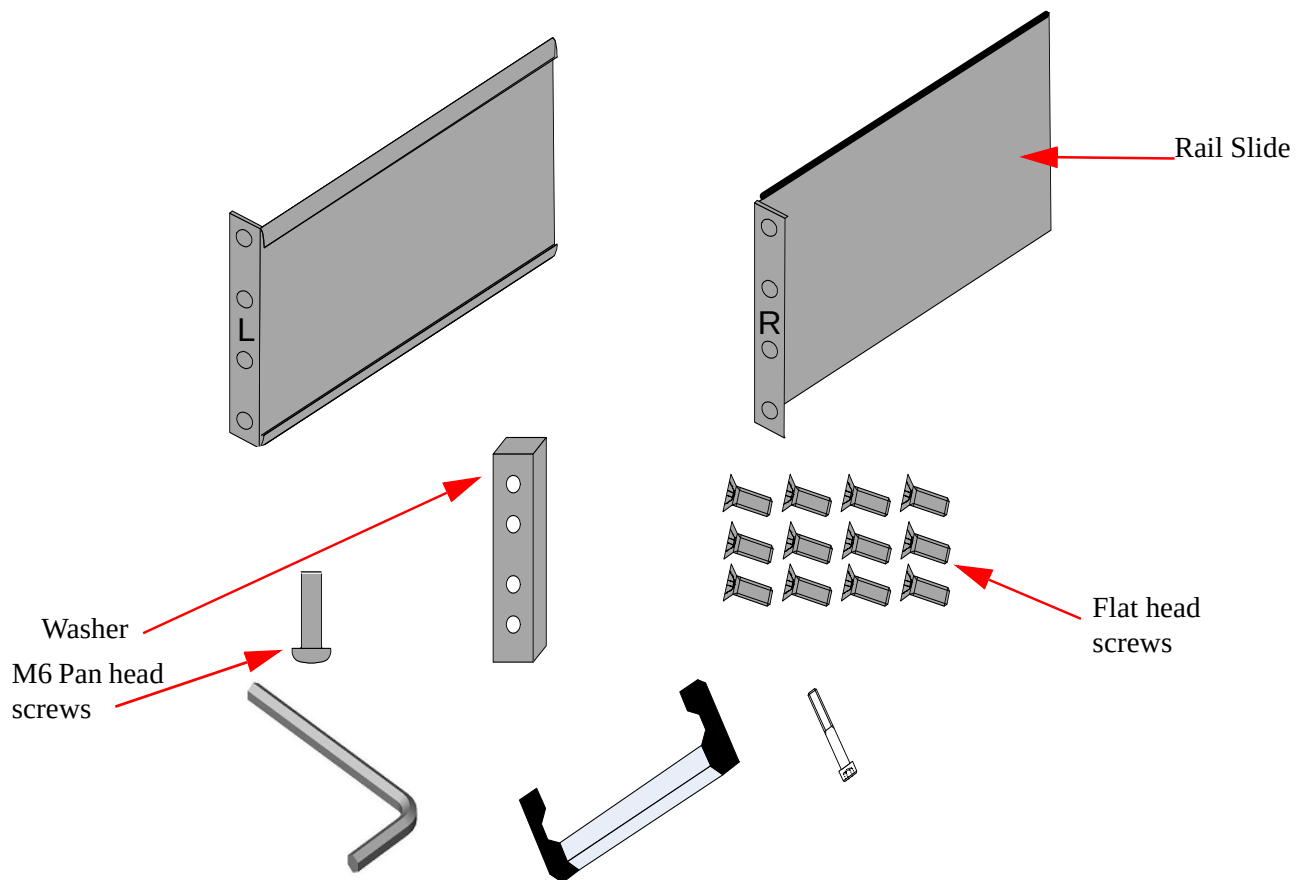
Figure 14: Shelf Installation Kit Parts

Figure 15: Chassis Installation Parts

Before starting the procedure, put the ESD strap on connect it to a valid ground.

3.2.2.2 Opening the Container

1. Before starting the procedure, put the ESD strap on and connect it to a valid ground.
2. Open the crate by opening the latches.
3. Unscrew the sides of the crate.
4. Remove and put aside the box containing the cables.
5. Remove and put aside the box containing the cable management kit.
6. Remove and put aside the box containing the Installation kit.
7. Visually inspect the chassis, make sure that:
 - there is no visible damage
 - all 3 spines are installed
 - 3 PSUs are installed
 - all 4 fans are installed
 - 1 management module is installed
8. Remove all protective plastic film from all sides and top of the chassis.

9. If you wish you may reduce the weight of the chassis by removing all of the spines, power supply units, fan units, and management modules, and put aside for reinstallation after the chassis is installed in the rack.

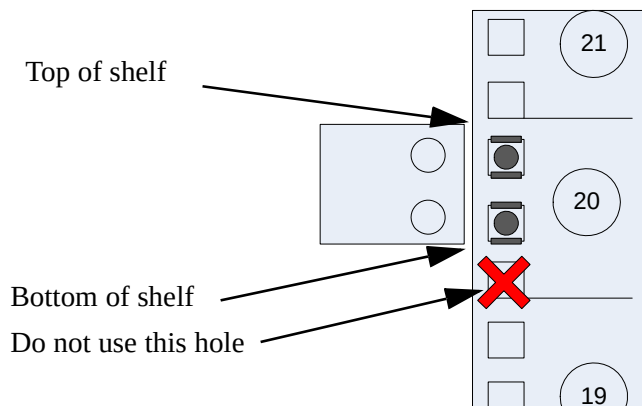


The leafs are shipped separately.

3.2.2.3 Installing the Shelf

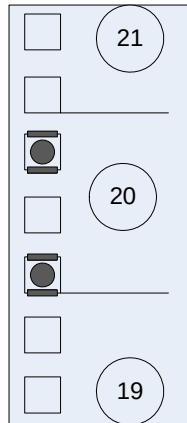
- 10.
- 11.
1. Place the ESD mat on the floor where you will be working and put on the ESD strap. Make sure the ESD strap is touching your skin and that the other end is connected to a verified ground.
2. Clip 4 caged nuts into the holes in the rack you will be using to connect the brackets. Check that both sides of the shelf are at the same level in the rack.

Figure 16: Inserting the Caged Nuts for the Shelf



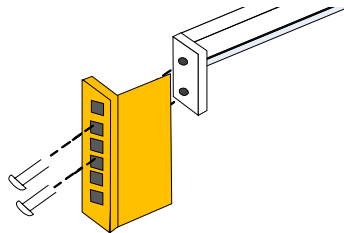
3. Clip 4 caged nuts into the holes in the rack you will be using to connect the rail slides. Check that both sides of the shelf will be at the same level in the rack.

Figure 17: Use These Holes for the Rail Slides

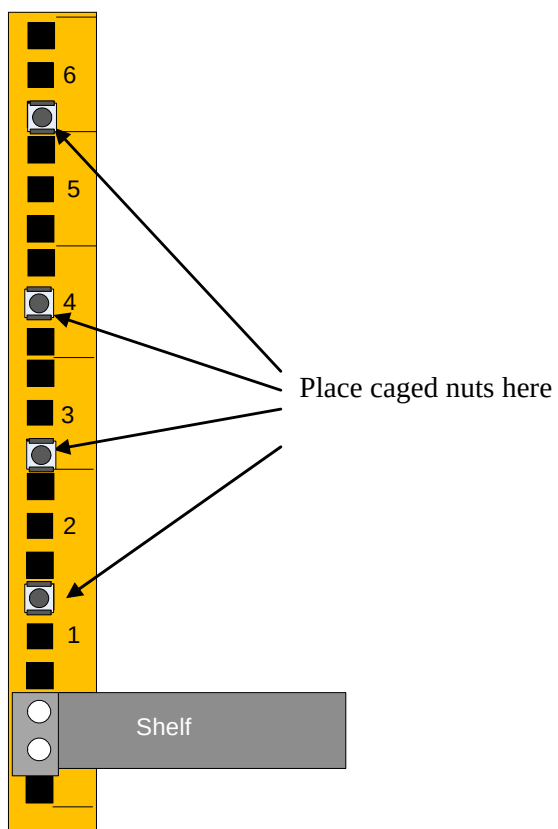


4. Using two of the bolts for each rail slide, install the rail slides onto the rack. Check that both sides of the switch, left and right, are the same level in the rack.

Figure 18: Connect Rail Slide to Rack Vertical support



5. Place the four bolts for the caged nuts within reach.
6. Slide the shelf into the rail slides.
7. Put the shelf into place and screw the bolts into the nuts from step 2.
8. Tighten all of the screws to 9.2 Nm or 81.5 pound inches.
9. Insert 8 caged nuts for the faceplate in the exact locations shown in the Figure 19, "Inserting the Caged Nuts for the Faceplate".

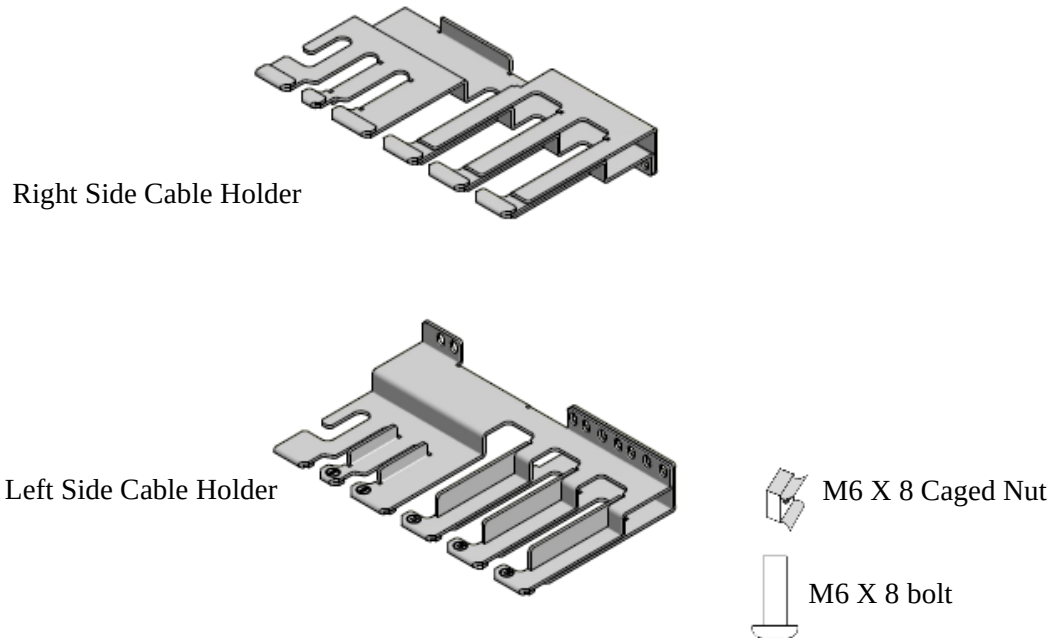
Figure 19: Inserting the Caged Nuts for the Faceplate

3.2.3 Installing the Cable Holder

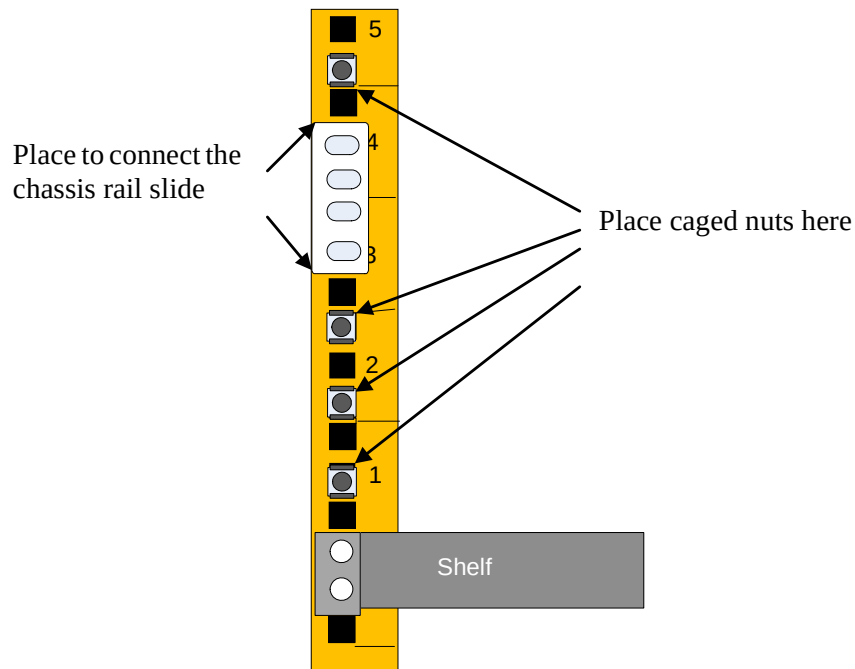


Now is the time to install the cable holder.

Figure 20: Cable Holders



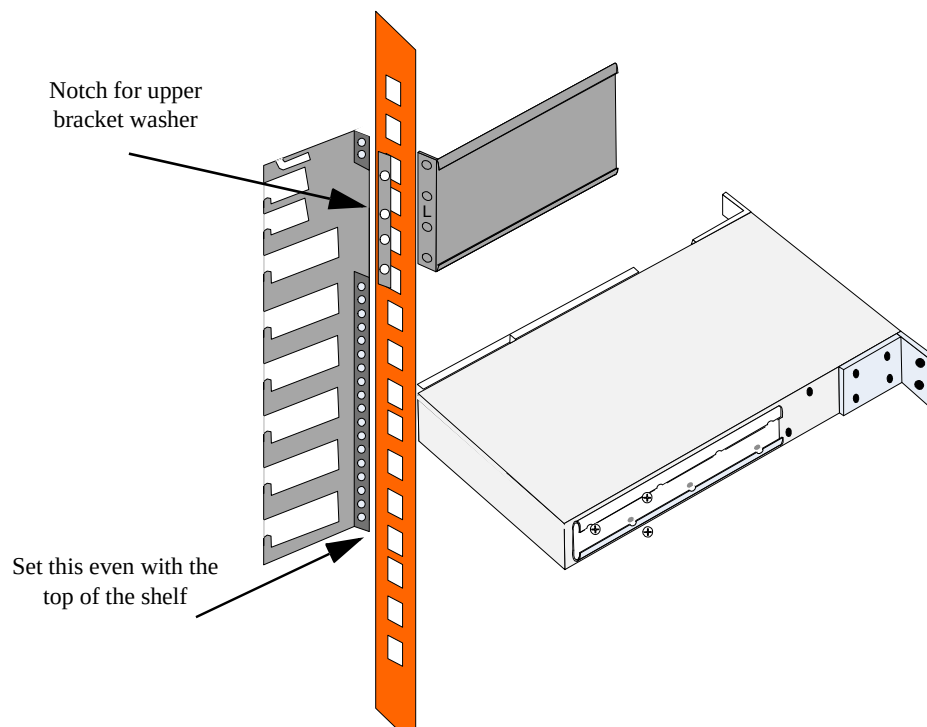
1. Place the Cable holder next to the rack, on the connector side of the chassis, and identify the holes where the caged nuts are to be placed.

Figure 21: Inserting the Caged Nuts for the Cable Holder

The cable holders should go to the outside of the vertical supports.

2. Set the bottom of the cable holder at the level of the shelf.

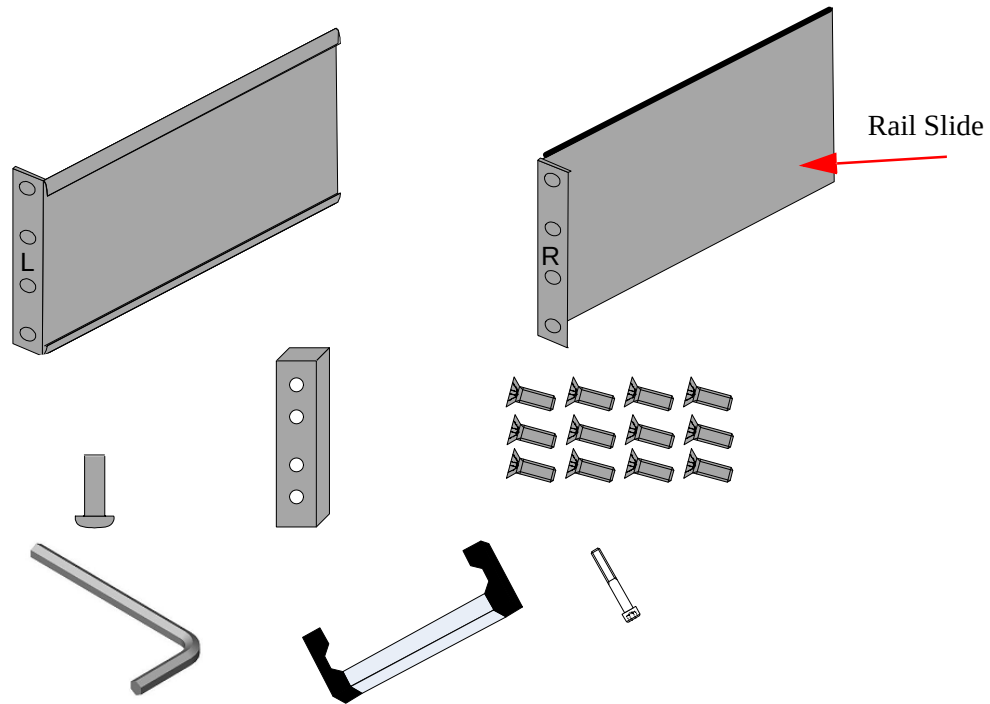
Note: If the cable holder is not set properly the upper bracket will not line up with the cable holder.

Figure 22: Cable Holder Placement

3. Screw the cable holder onto the rack using the screws provided.
4. Repeat steps 1- 3 for the second cable holder.

3.2.4 Installing the Chassis

Figure 23: Chassis Rails and Rail Slides



1. Screw the handles onto the chassis. Use the 8 allen head screws, and the allen wrench provided. Two handles go on the connector side and two go on the power side of the chassis.

Figure 24: Screw the Handles Onto the Chassis

The handles go here

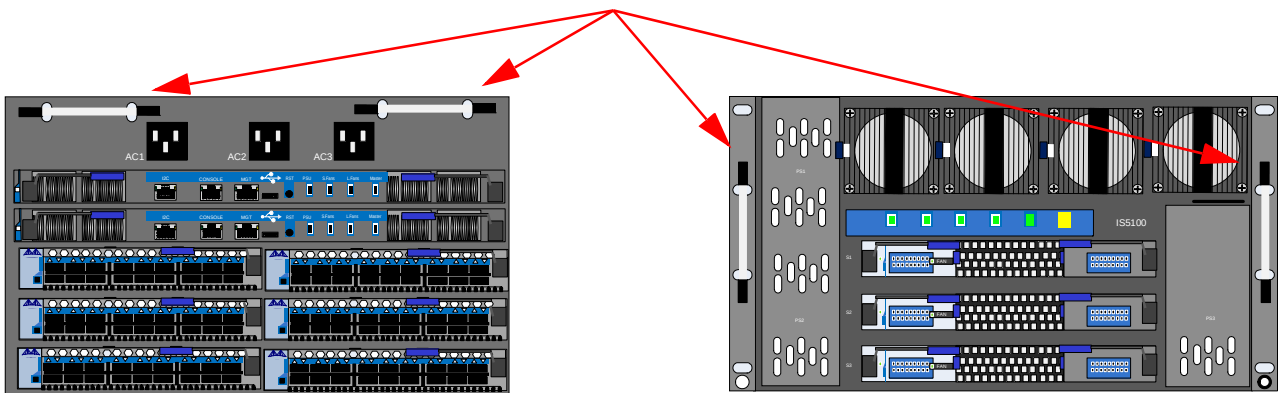
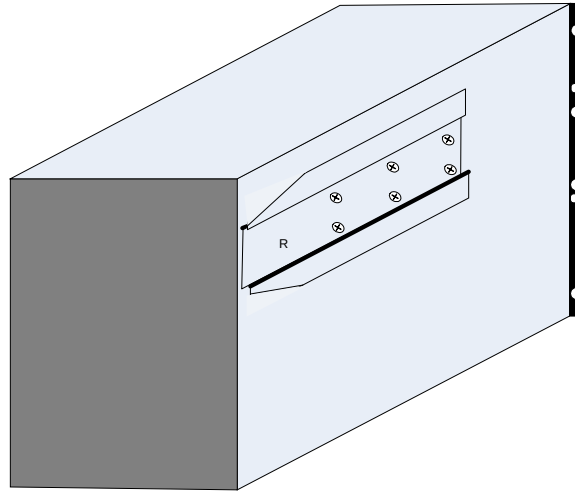
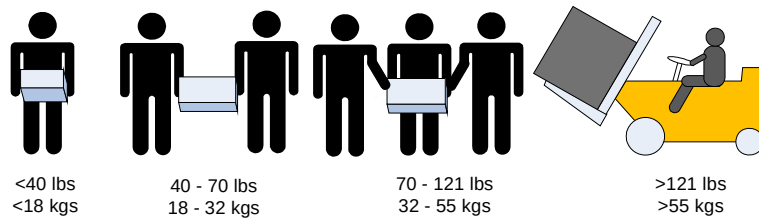


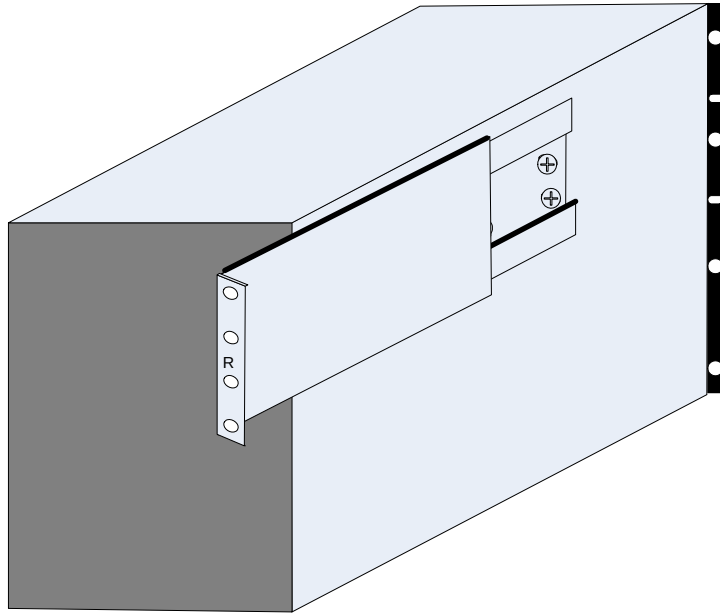
Figure 25: The Rails are Already Connected Onto the Chassis



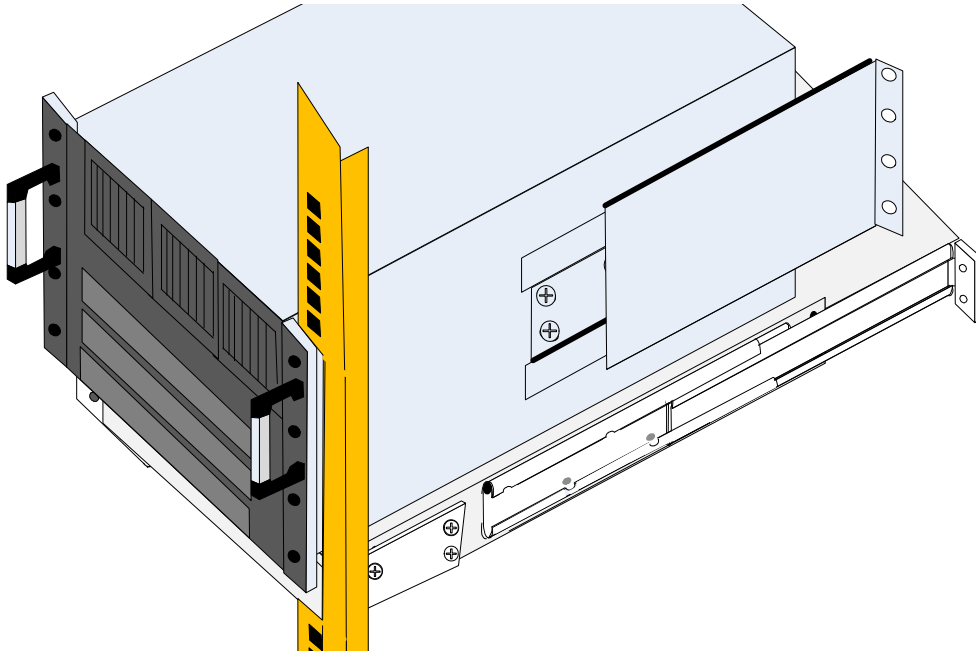
When lifting manually use your legs, **bend your knees**, and **not** your back.



2. Lift the chassis and slide it onto the shelf. Use a mechanical lift or enough people to safely lift the chassis. It weighs ~ 77kg / 170 lbs.
3. Push the chassis into the rack until the faceplate is ~ 20cm (~ 8") from the vertical support.
4. Put the rail slides onto the rails.

Figure 26: Put on the Rail Slide

5. Slide the chassis further into the rack.
6. Place the caged nuts in the rack in the places corresponding to their places in the faceplate.
7. Slide the chassis all the way into the rack until the faceplate is touching the vertical rack support. The caged nuts placed in the last procedure should line up with the holes in the faceplate.
8. Screw the 8 screws through the faceplate and into the caged nuts.
9. Slide the rail slides to the vertical rails.

Figure 27: IS5100 Chassis on the Shelf**Figure 28: Face Plate Mounting Bolt Locations**

Holes in the faceplate for mounting on the rack.

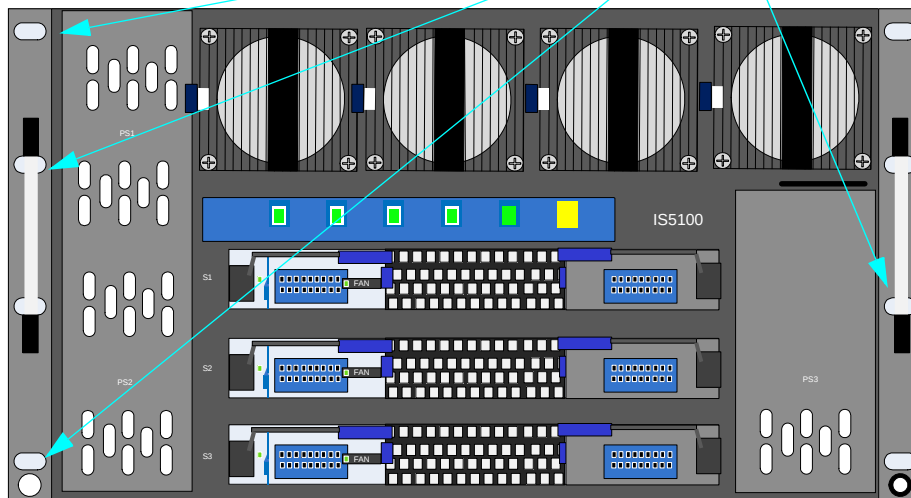
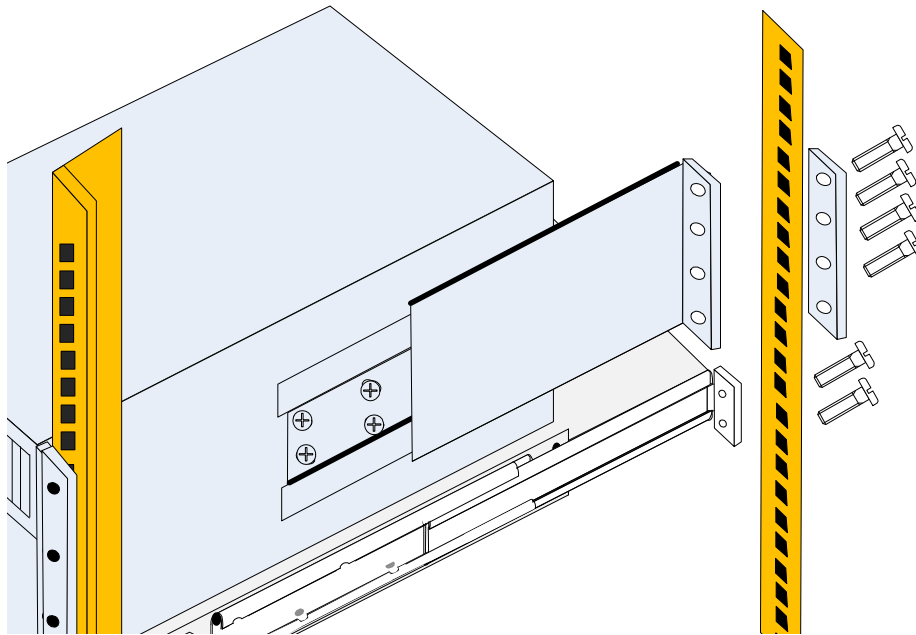


Figure 29: Move the Rail Slide to the Vertical Support

10. Place the 4 holed spacer on the outside of the vertical support and screw in the 4 screws for each rail slide.
11. Remove all four handles and save for future use.
12. Ground the switch.
13. Replace all of the spines, power supply units, fan units, and management modules removed at the start of the installation procedure.
14. Plug in the power cables.
15. Check the Status LEDs and confirm that all of the LEDs show status lights consistent with normal operation.



Warning: Any yellow status LEDs is cause for concern and must be dealt with immediately.

It can take up to 3 minutes to boot up, during which time the status LED may indicate red.

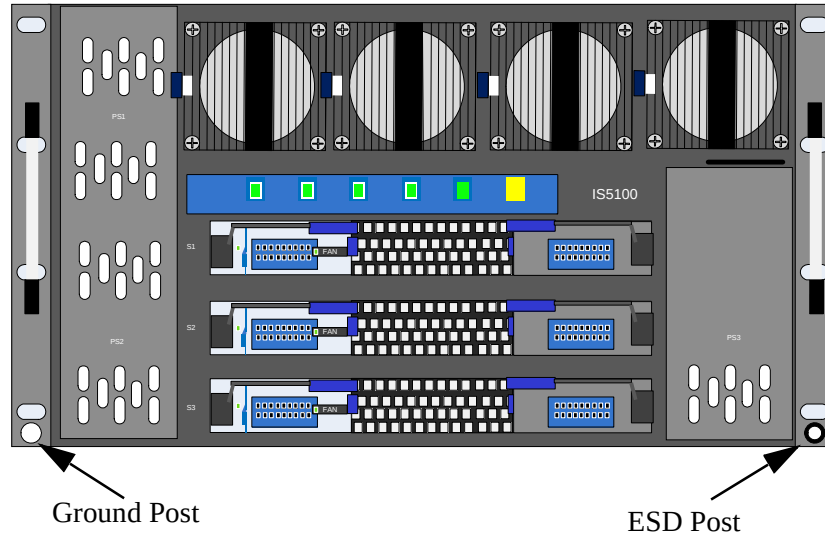
16. You can start connecting all of the cables to the switch.

3.2.5 Ground Connections

Make sure to connect the ground post to a valid electrical ground. Use a grounding lug and a ground wire of sufficient capacity to safely convey a potential discharge. A ground wire of AWG 6 or 4mm diameter is recommended for grounding this device. The chassis is concurrently grounded through each of the PSUs. Only connect the PSU cords to properly grounded outlets. Do not rely on the PSU grounds. It is absolutely necessary to connect the grounding post. Make sure the connections are solid and permanent. If you choose to not use the ground screw, make sure that the

rack is properly grounded and that there is a valid ground connection between the chassis of the switch and the rack. Test the ground using an Ohm meter.

Figure 30: Ground Connection



3.3 Power Connections

The switch includes integrated hot-swap power supplies which support up to 3 load-sharing 1000W supply units. The slots for the power supply units (PSUs) are on the spine side. The left side has odd numbered PSUs and the right side has even numbered PSUs. Each PSU has a dedicated AC inlet. This design enables the optional use of separate main and backup AC feeds. The input voltage is Autorange, 100-240 VAC, 50Hz or 60Hz. The output voltage for the PSUs is 48V. The power cords should be standard 3-wire AC power cords including a safety ground.

Before starting any procedure on the IS5100 series switch system put an ESD prevention wrist strap on your wrist and connect to the IS5100 series Chassis.

3.3.1 Powering Up the Switch Platform

Note: Make sure that the power cords are compatible with your outlets. Power cords for different countries can be ordered from Mellanox.

1. Plug in the power cords to the PSUs.
2. Plug the other end of the power cord into a grounded outlets.



Make sure that the outlets and circuits will not be overloaded. Spread out the load over at least two or three circuits or use a 3 phase circuit.

The Chassis must be started with a full compliment of PSUs, thereafter it can run on one less than the total number of PSUs. This final PSU is redundant and allows for hot swapping a PSU should one fail. Connecting the PSUs to different AC lines provides AC failover protection.

A system should continue to run and allow a hotswap of a defective PSU. Should there not be enough power to keep all of the leafs running, FabricIT EFM may power down some leafs. If this happens it may be necessary to reboot the chassis once the defective PSU has been replaced.

The power system will divide the current consumption by the number of working PSUs. Should one of the PSUs fail, the total current consumption will then be divided by the remaining working PSUs. When the failed PSU is hot swapped the new PSU will ramp up and pass its share of current, so that the total current is always divided by the number of working PSUs.

Figure 31: Multiple Power Inlets - Electric Caution Notification

CAUTION	ACHTUNG	ATTENTION
Risk of electric shock and energy hazard. The PSUs are all independent.	Gefahr des elektrischen Schocks. Entfernen des Netzsteckers eines Netzteils spannungsfrei. Um alle Einheiten spannungsfrei zu machen sind die Netzstecker aller Netzteile zu entfernen	Risque de choc et de danger e'lectriques. Le de'branchment d'une seule alimentation stabilise'e ne de'branch uniquement qu'un module "Alimentation Stabilise'e". Pour isoler completement le module en cause, Il faut de'brancher toutes les alimentations stabilise'es.
Disconnect all power supplies to ensure a powered down state inside of the switch platform.		

3. Check the Status LEDs on all of the management modules and confirm that all of the LEDs show status lights consistent with normal operation.



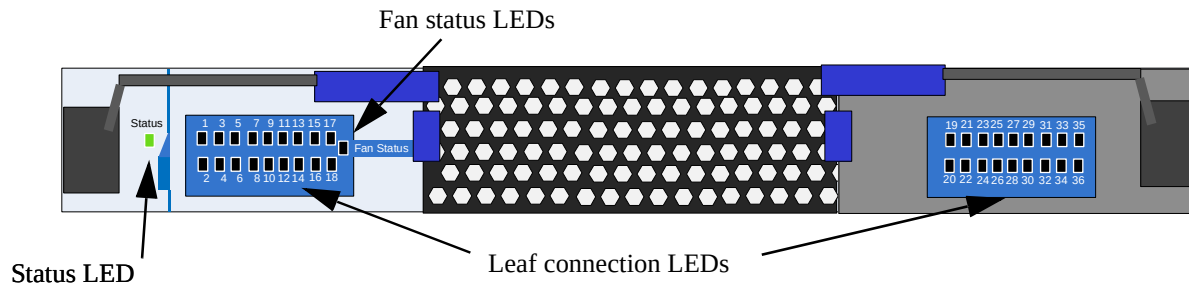
Warning: Any yellow or red status LEDs on any of the management modules is cause for concern and must be dealt with immediately.

4. Check that none of the LEDs on the spines are yellow.



It can take up to 3 minutes to boot up the system. during this time the status LEDs may be RED. Turn off the system if any LEDs remain red for no more than 3 minutes.

5. Check that the Leaf status LED, Fan status LED, and Spine status LED in the spines are all green.

Figure 32: Spine Module

3.4 InfiniBand QSFP Cable Installation

The switch uses industry standard QSFP InfiniBand cables which are available from several vendors. The standard QSFP cables support full 40+40Gb/s (QDR), 20+20Gb/s (DDR) and 10+10Gb/s (SDR) bidirectional wire speed of the switch ports. All InfiniBand QSFP connections are made to the leaf boards. Each leaf has 18 InfiniBand QSFP connectors in two rows, which are numbered 1-18.



If maximum cable lengths are exceeded data transfer will be reduced and the bit error rate will increase.

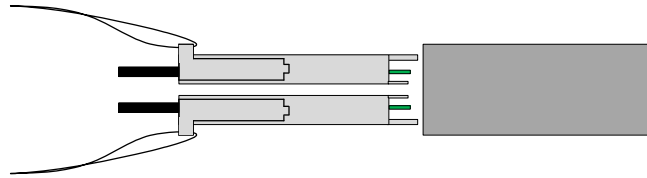
All cables can be inserted or removed with the unit powered on. To insert a cable, press the connector onto the port receptacle until the connector is firmly seated. The green LED indicator above the port will light when the physical connection is established (when both ends of the cable are properly connected to working devices). Allow 15 seconds for link to get up. To remove, disengage the lock and slowly pull the connector away from the port receptacle. For a valid physical connection both ends of the cable must be connected to working devices.



Warning: Take care to not impede the air flow through the ventilation holes next to the InfiniBand ports. Use cable lengths which allow routing horizontally around to the side of the chassis before bending upward or downward in the rack.



Cables in the bottom row should be inserted up side down in relation to the how the cables are inserted in the top row.

Figure 33: Top and Bottom Ports

3.4.1 Cable Power Classes

Chassis and switches need to be able to dissipate the heat generated by high power I/O cables and modules. The Mellanox IS5X00 series chassis are rated for cables up to class 2 as per the SFF committee classification ([SFF-8436.PDF](#)).

See <http://www.mellanox.com/content/pages.php?pg=cables> for the cable class rating of Mellanox cables.

4 Chassis Power Up

Before starting any procedure on the IS5100 series chassis system put an ESD prevention wrist strap on your wrist and connect to the IS5100 series chassis.

The chassis must be started with a full complement of PSUs, that is 3. Thereafter it can run on one less than the total number of PSUs. This final PSU is redundant and allows for hot swapping a PSU should one fail. Connecting the PSUs to different AC lines provides AC failover protection.

A system should continue to run and allow a hotswap of a defective PSU. Should there not be enough power to keep all of the leafs running, FabricIT EFM may power down some leafs. If this happens it may be necessary to reboot the chassis once the defective PSU has been replaced.

1. Check all:
 - boards
 - power supplies
 - leaf fan modules
 - spine fan modulesfor proper insertion and seating before connecting the AC power cords.
2. All leafs that you plan to use, insert in the chassis.
3. Insert thermal blanks in unused leaf slots to maintain balanced air flow.
4. Tighten all mounting screws.
5. Connect the power cords to the PSUs.
6. Connect the power cords to grounded electrical outlets.



Do not power up the chassis with less than all PSUs installed.



Populate the chassis with the leafs before you power up the chassis.

4.1 Power Supply and Spine Board Indicator Status at Power ON



It can take up to 3 minutes to boot up the system. during this time the status LEDs may be RED. Turn off the system if any LEDs remain red for more than 3 minutes.

As the power is turned on, you should observe the following conditions for normal operation:

1. Power Supply Unit(s) AC OK and DC OK indicators are ON and FAIL indicators are OFF.
2. There is a *green* Status LED per spine board, per leaf board, and per management module that indicates power supplies are good.
3. Spine Board indicators will display status of internal links to the installed leaf boards. All PHY links to existing leaf Boards should be ON.
4. Check the management module LEDs and make sure they coincide with Table 11.

Table 11 - LEDs Display for Normal Operation

LED	Description	Normal State
STATUS	Off = No Power Green = System is up and running. Yellow = System warning. Attention needed (such as overheating). Red = System not operational (Diagnostics fail, CPU hang, HW fail, Overheat-critical) Blinking Yellow = System booting / Restore factory defaults in progress.	Green
PSU STATUS	Off = No power Green = Normal operational Red = PS fault detected. User should check individual power supplies for fault indications.	Green
SPINE FANS STATUS	Off = No power to fan Green = Nominal operational Yellow = Non fatal failure Red = Fatal failure Turn the chassis off and then troubleshoot	Green
LEAF FANS STATUS	Off = No power to fan Green = Nominal operational Yellow = Non fatal failure Red = Fatal failure Turn the chassis off and then troubleshoot	Green
MGT1 STATUS	Off = no power or this management module is not installed Green = Management module is operating as a master (i.e., the other management module is a slave) Yellow = Management module is operating as a slave (i.e., the other management module is a master)	Green
MGT2 STATUS	Off = no power or this management module is not installed Green = Management module is operating as a master (i.e., the other management module is a slave) Yellow = Management module is operating as a slave (i.e., the other management module is a master)	Yellow

5 Insertion and/or Hotswap Extraction

Before starting any procedure on the IS5100 series Switch system, put an ESD prevention wrist strap on your wrist and connect to the IS5100 series Chassis.



When hotswapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

This switch platform supports Hotswap capabilities for the:

- Power supply units
- Leaf boards
- Spine boards
- Leaf fan module
- Spine fan module
- Management modules

5.1 Power Supply Units



When hotswapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

A PSU (Power Supply Unit) can be extracted without bringing down the system, as long as no more than one PSU is bad.

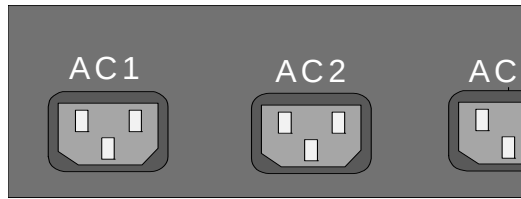
The power required to run the switch system is equally divided between all of the working PSUs.

5.1.1 Extracting and Inserting the Power Supply Unit

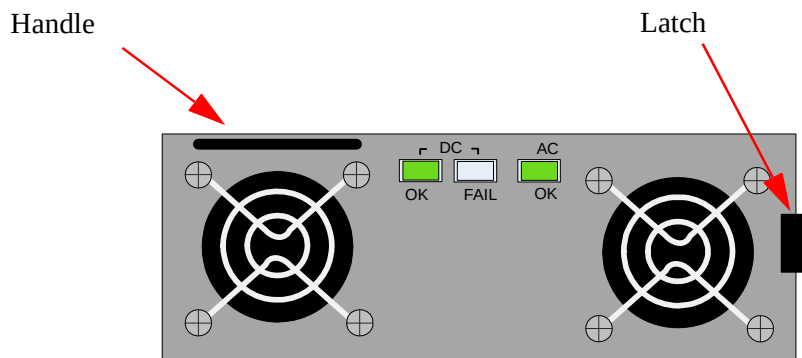
With all of the power supplies installed, the system is in the redundant configuration, any single PSU may be extracted without bringing down the system.

To extract a PSU:

1. Remove the power cord from the power supply unit. Note which power cord it is according to the AC numbering.

Figure 34: Power Cord Top Bar

2. On the spine side of the chassis, remove the cover to the power supply unit for the non-working PSU.

Figure 35: Power Supply

3. Grasping the handle with one hand, push the black latch release while pulling the handle outward. As the PSU unseats, the PSU status indicators will turn off.
4. Remove the PSU.

To insert a PSU:

1. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.
2. Insert the PSU by sliding it into the opening until a slight resistance is felt.
3. Continue pressing the PSU until it seats completely. The latch will snap into place confirming the proper installation.
4. Insert the power cord into the supply connector on the other side of the chassis.
5. Replace the cover over the PSUs.



The green indicators should light. If not, extract the PSU and re-insert it again.

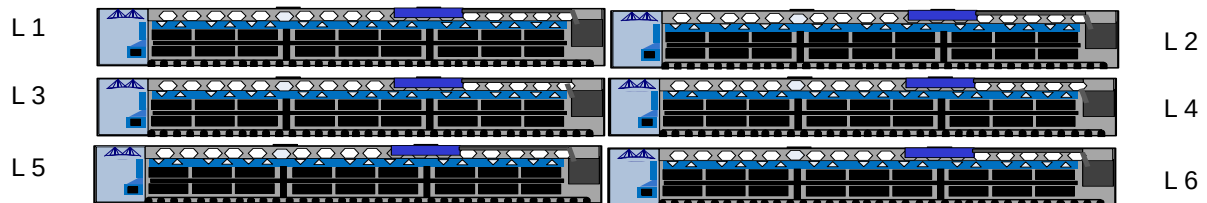
5.2 Leaf Boards



When hotswapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

The leaf boards are numbered from top to bottom, with corresponding numbers displayed to the outside of the leafs vertically along the side panel.

Figure 36: Leaf Board Numbering

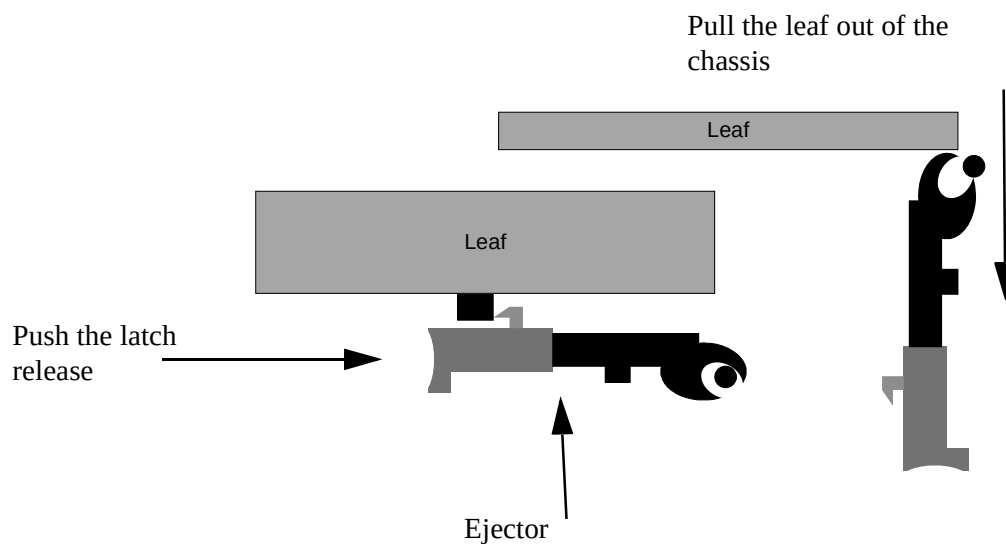


5.2.1 Extracting a Leaf Board

Each leaf board has an ejector that locks the board in place and serves as a lever for seating or extracting (see Figure 45).

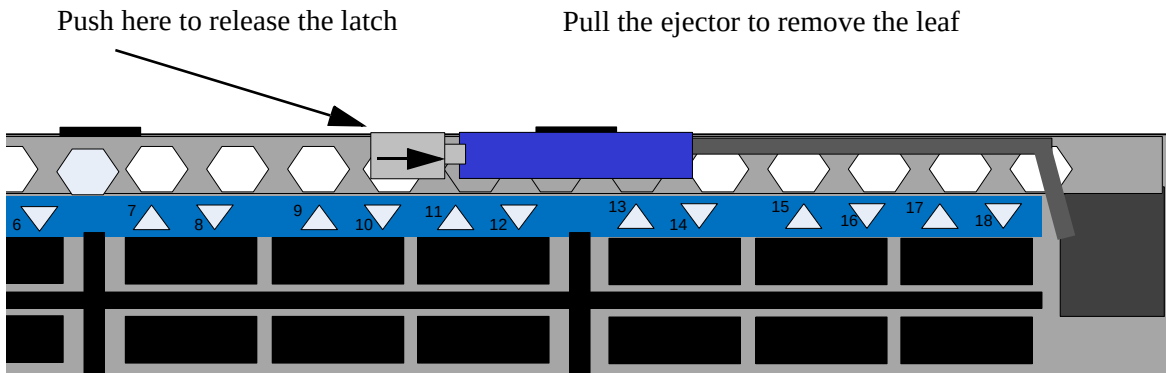
1. Disconnect all cables connected to the leaf.
2. Push the latch to unlock the ejector from the chassis.
3. Open the ejector until it is 90 degrees from the leaf.
4. Pull out on the leaf.

Figure 37: Ejector Latch



Note: The board is short, therefore do not let go of it while sliding it out.

Figure 38: Leaf Release



5.2.2 Inserting a Leaf Board

Start with the latch fully open, that is perpendicular to the front panel of the leaf. Carefully set the leaf board into the side guide rails and slowly slide the board into the chassis. Catch the hooks onto the vertical bar and push the latch shut.

5.3 Spine Boards

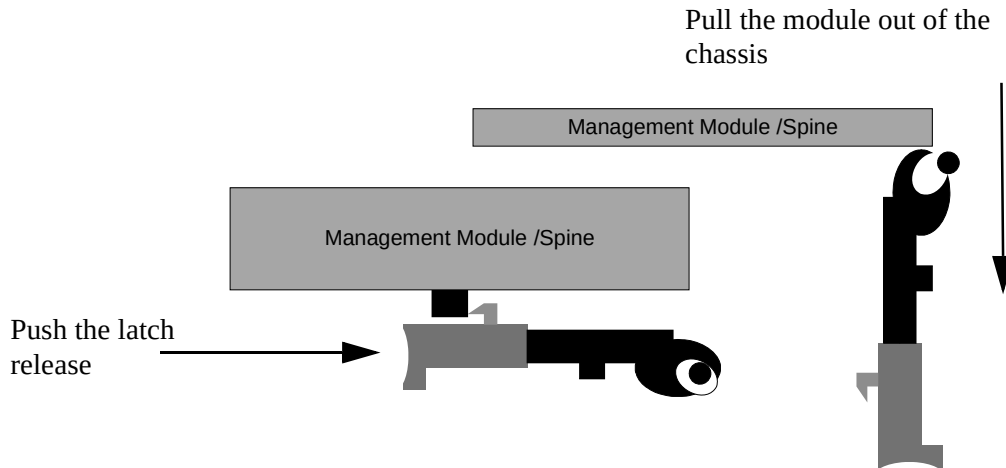
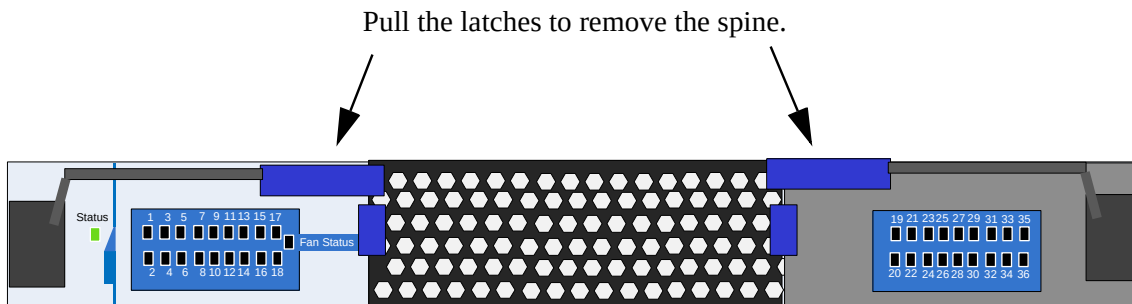


When hotswapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

Each spine has a pair of ejectors that lock the board in place and serve as levers for seating or extracting (see Figure 39).

5.3.1 Extracting a Spine Board

1. Push outward on the latches to unlock the ejectors from the chassis.
2. Open the ejectors until they are 90 degrees from the module.
3. Pull out on the module using both ejectors.

Figure 39: Ejector Latch**Figure 40: Spine Board Extraction**

5.3.2 Inserting a Spine Board

1. Hold the spine board by the sides with both latches fully open.
2. Insert the board into its rail. The board should slide in *without* resistance.
3. Push the board in until the hooks on the latches are touching the vertical bar.
4. Now press both latches inward simultaneously. You should feel the latches are hooked into the front panel.
5. Press both latches applying some force to close them completely. The locking latch will engage.

5.4 Fan Modules

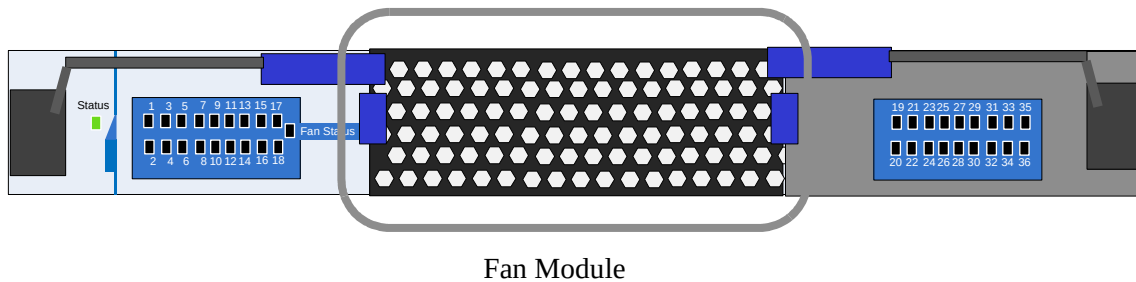


When hotswapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

There are four fan modules on the chassis for the leafs. They are located on the spine side, along the top of the chassis. When a fan module is not functioning the status LED on the fan will light up.

Each spine module has a fan module with two individual fans built in. When a fan module is not functioning the status LED on the fan will light up.

Figure 41: Spine Fan Module



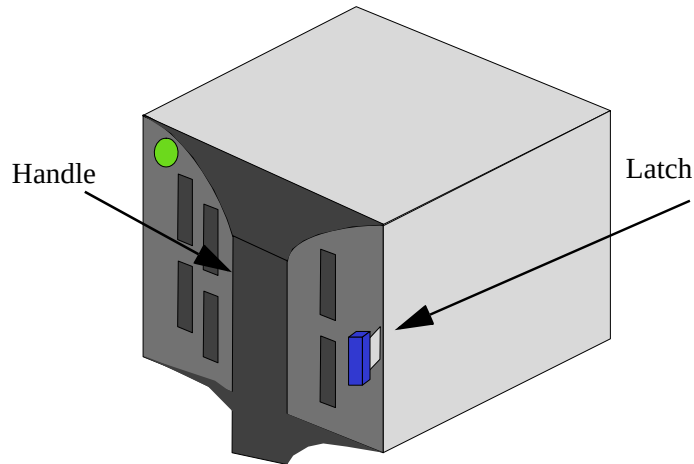
5.4.1 Leaf Fan Module

There are 4 Leaf fan modules found on the Spine side.

The leaf side fans are not interchangeable with the spine side fans. Air flow through the leafs is independent of the air flow through the spines.

5.4.1.1 Extracting the Leaf Fan Module

1. Push and hold the blue latch release. See Figure 42.
2. Slowly pull out the fan module using the handle.

Figure 42: Leaf Fan Module Extraction

5.4.1.2 Inserting the Leaf Fan Module

1. Make sure the fan module is oriented correctly top side up. Confirm that the location of the connector in the chassis will line up with the connector in the fan module.
2. Slowly slide in the new leaf fan module.



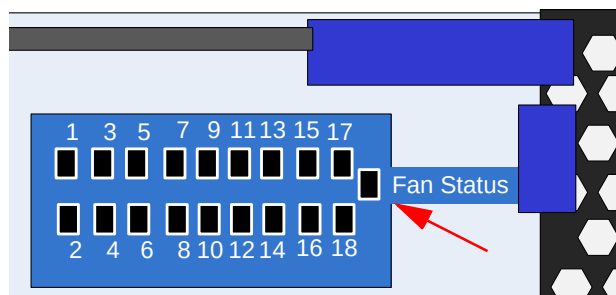
If the fan module stops before it goes in all of the way it is inserted incorrectly!

3. Push the fan module until the latch engages.
4. Make sure that the green leaf LED on the module comes on (indicating that fan is running).

5.4.2 Spine Fan Modules

Each spine fan module contains two individual fans. Should a single fan fail the Fan Status LED on the spine and on the management module will light, indicating the necessity to replace the fan module. Air flow through the spines is independent of the air flow through the leafs.

When a fan module is removed the indicator light will reset.

Figure 43: Fan Status LED on the Spine Module

5.4.2.1 Extracting the Spine Fan Module

1. Push the two blue latch buttons together while pulling the fan module out.

5.4.2.2 Inserting the Spine Fan Module

1. Make sure the fan module is oriented correctly top side up. Confirm that the location of the connector in the chassis will line up with the connector in the fan module.
2. Slowly slide in the new spine fan module.
3. Push the fan module until as far as it will go, make sure the locking latches engage.

5.5 Management Module



When hotswapping any of the units, it is necessary to wait 1 minute after removing the defective part before inserting the new part. This is necessary so that the management module will start a new cycle checking through the leafs and spines for the FW versions.

Before starting any procedure on the IS5100 series Switch system put an ESD prevention wrist strap on your wrist and connect to the IS5100 series Chassis.

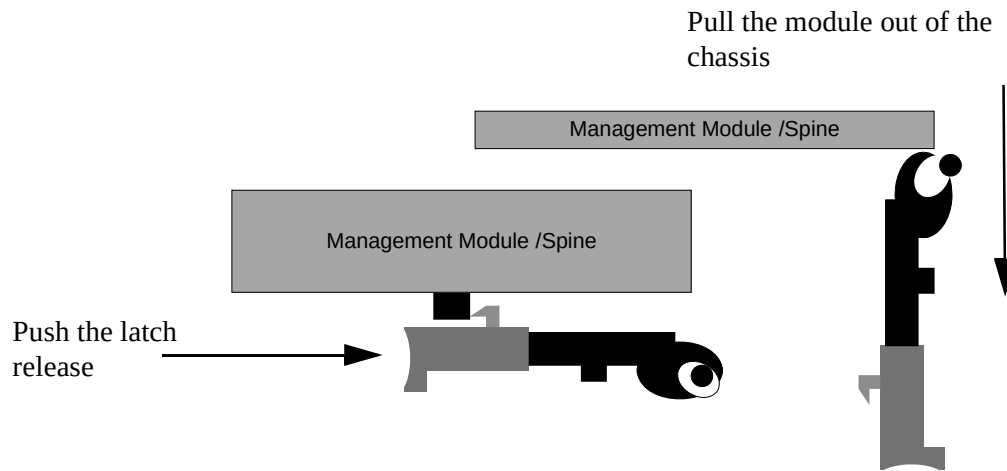
5.5.1 Extracting a Management Module

Management modules are located on the leaf side, above the leafs. There are two places to install the management modules.

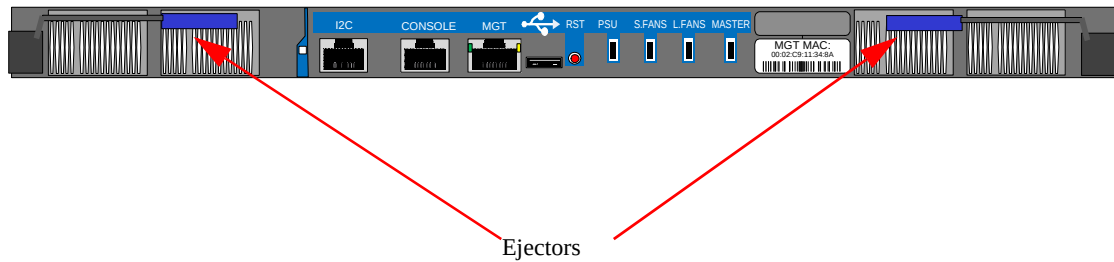
Note: Only one management module is required to run the switch system.

Each management module has a pair of ejectors that lock the board in place and serve as a lever for seating or extracting (see Figure 45).

1. Disconnect all cables connected to the management module.
2. Push outward on the latches to unlock the ejectors from the chassis.
3. Open the ejectors until they are 90 degrees from the module.
4. Pull out on the module using both ejectors.

Figure 44: Ejector Latch

Note: The board is short, therefore do not let go of it while sliding it out.

Figure 45: Management Module

5.5.2 Inserting a Management Module

1. Carefully seat the management module into the slot and slowly slide the board into the chassis until the ejectors begin to engage on the chassis edge.
2. Press the ejectors inward until the locks snap. This indicates that the board is fully seated.

6 Disassembly and Disposal

6.1 Disassembling the Chassis

1. Power down the chassis.
2. Remove all power cables.
3. Remove all connector cables.
4. Disconnect the ground lug from the ground post.
5. Remove all leafs.
6. Remove all spines.
7. Remove all management modules.



This product and all of its parts are NOT to be disposed of with household waste. This product contains printed circuit boards cables and batteries. According to the WEEE Directive 2002/96/EC, all waste electrical and electronic equipment (EEE) should be collected separately and disposed of according to the directive.

8. Dispose of these pieces in a legal and environmentally friendly way.

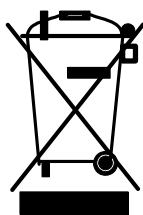
6.1.1 Removing the Chassis

1. Remove the screws connecting the upper brackets to the rack.
2. Remove the screws holding the chassis to the rack. These screws are located in the faceplate on the spine side of the chassis.
3. Remove the upper brackets from the chassis.
4. Dispose of the Chassis in a legal and environmental way.

6.1.2 Removing the Bottom Shelf

1. Remove all of the bolts that are holding the shelf to the rack.
2. Remove the shelf.
3. Remove all of the caged nuts.

6.2 Disposal



According to the WEEE Directive 2002/96/EC, all waste electrical and electronic equipment (EEE) should be collected separately and not disposed of with regular household waste.

Dispose of this product and all of its parts in a responsible and environmentally friendly way.

7 Switch Management Tools

This chapter describes the management module and tools available for Out-of-Band management of the switch system via FabricIT EFM.



There are 2 Ethernet ports (1 for each management module) that each get connected to Ethernet switches. These switches must be configured to 10/100M auto-negotiation.

The IS5100 switch is pre-installed with a license supporting of up to 648 nodes. If there is a need to support more than 648 nodes, an optional license of Unified Fabric Manager™ (UFM™) is needed.

Management modules have the capability to allow remote monitoring and remote management of the chassis from any host connected to the fabric.

The managed switch system includes a CPU which contains:

- embedded OS, secure in-band, out-band access
- chassis manager and system BIST
- SNMP agent, 3rd party tool integration
- GUI
- Subnet Manager (SM)

The chassis manager will give the user access to:

- switch temperatures
- power supply voltages
- fan unit information
- power unit information
- Flash memory

The manager also has the ability to burn new firmware on the switch.

7.1 Subnet Management

The Subnet management features include:

In addition, the tools enable firmware management capabilities such as:

- upgrading drivers
- upgrading software
- monitoring of:
 - AC power to the PSUs

- DC power out from the PSUs
- board temperature
- fan module unit
- failure in the switch system
- system failure in the switch system
- querying for board serial numbers and their revisions

7.2 Fabric Management with UFM

For an added licensing fee you can purchase Mellanox's Unified Fabric Manager. UFM is a powerful platform for managing scale-out computing environments. It enables data center operators to efficiently monitor and operate the entire fabric, boost application performance and maximize fabric resources utilization.

UFM provides a central management console including the following main features:

- querying for existing firmware versions
- burning new firmware (from scratch or for recovery from damaged firmware)
- querying for and changing system GUIDs
- checking for duplicate or bad GUIDs
- Fabric dashboard including Fabric Congestion Map
- Advance Fabric-wide real-time and history monitoring
- Quality of Service
- Traffic Aware Routing Algorithm (TARA)
- Central Device Management
- Task automation
- Threshold based alerts
- Fabric segmentation/isolation
- Logging
- High-Availability

7.3 Accessing the CPU via the Ethernet Connector

Once the initial configuration is completed the management tools can be accessed through:

- SSH
- Telnet
- the WEB

7.4 Downloading Firmware

Firmware for this switch system can be found at and downloaded from:

<http://www.mellanox.com> => Downloads => Firmware.

Be sure to read and follow all of the instructions regarding the updating of the firmware on your switch system. Firmware for the HCA cards connected to this switch system can be downloaded from the same site.

7.5 Open SM

To manage the Mellanox switch system using OFED, download Mellanox Open Fabrics from:

<http://www.mellanox.com> > Downloads > InfiniBandSW/Drivers.

Be sure to read and follow all of the instructions regarding the installation and use of these tools.

Each InfiniBand subnet needs one subnet manager to discover, activate and manage the subnet.

An InfiniBand® network requires a Subnet Manager to be running in either the Infiniband switch itself (switch based) or on one of the nodes which is connected to the Infiniband fabric (host based).

The InfiniBand subnet manager (OpenSM) assigns Local IDentifiers (LIDs) to each port connected to the InfiniBand fabric, and develops a routing table based on the assigned LIDs.

A typical InfiniBand installation using the OFED package will run the OpenSM subnet manager at system start up after the OpenIB drivers are loaded. This automatic OpenSM is resident in memory, and sweeps the InfiniBand fabric approximately every 5 seconds for new InfiniBand adapters to add to the subnet routing tables.



If FabricIT EFM is updated and the FW image in the leafs and spines of the chassis is an earlier version than the minimum that the new version of EFM can work with, then the chassis management system may require up to ~45 minutes to update all of the FW images in all of the leafs and spines.



On IS5X00 systems, when having dual management systems, first connect the cable and configure the master management module CPU and only then configure the slave. By default the master CPU is the top management module. For further information on the master and slave roles, see the FabricIT Software UM section “High Availability” for more information.

Initial configuration must be done on all of the management modules. See the Installation Guide for the Initial Configuration procedure.



All management modules in the chassis must go through an initial configuration procedure. See the Installation Guide for the initial configuration procedure.

8 TroubleShooting

As each PSU is plugged in, make sure that the green power LEDs on the PSU come on.

8.1 Power Supply Unit

Note: If the Power supplies cannot supply enough power the management module may shut down the system.

If the AC power LED is off:

1. Check that the power cable is the correct power cable for your country.
2. Check that the power cable is plugged into a working outlet.
3. Check that the power cable has a voltage within the range of 100 - 240 volts AC.
4. Remove and reinstall the power cable.
5. Check the circuit breakers to be sure that the breaker has not tripped.
6. Check that the power cable is good. Replace the power cable.
7. If the AC power LED is green but the OK power LED is off or the FAIL LED is on – Replace the PSU.

8.2 Leaf Board

The power LED for the Leaf board is off:

1. Make sure that all of the PSUs are showing DC OK.
2. Uninstall and reinstall in the Leaf board.
3. When the Yellow LED is on, this indicates a fault in the board, uninstall and reinstall the Leaf board.
4. If uninstalling and reinstalling the Leaf board does not work, burn the latest FW on the Leaf board and uninstall and reinstall the Leaf board.
5. Replace the Leaf board with a new one.

Note: Should any of the boards shut down due to over temperature, follow the procedure starting in Step 2.

The Physical link LED for the InfiniBand connector does not come on:

1. Check that both ends of the cable are connected.
2. Check that the locks on the ends are secured.
3. Make sure that the latest FW version is installed on both the HCA card and the switch.
4. If media adapters are used check that the all connections are good, tight, and secure.
5. Replace the cable.

The Activity indication does not come on:

Check that the Subnet Manager has been started.

8.3 Management Module

8.3.1 Yellow LED for the Management Module is Lit

1. Remove and reinstall the management module. Make sure the mating connectors of the unit are free of any dirt and/or obstacles. See Section 5.5 on page 57.
2. Make sure that the spine and the leafs both have the same version of FW.
3. Reburn the FW and remove and reinstall the management module.
4. Replace the management module.

8.3.2 Yellow LED for the Leaf Fan is Lit

1. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules and ventilation holes are not blocked (especially dust over the holes).
2. If you find dust blocking the holes it is recommended to clean the fan unit and remove the dust from the front and rear panels of the switch using a vacuum cleaner.
3. Remove and reinstall the fan unit. Make sure the mating connector of the new unit is free of any dirt and/or obstacles. See Section 5.4 on page 55.



Replace defective leaf fan modules as soon as they are identified.



Should any of the boards shut down due to over temperature, follow the procedure starting in Step 1.

8.3.3 Yellow LED for the Spine Fan is Lit

1. Determine which spine has a defective fan.
2. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules and ventilation holes are not blocked (especially dust over the holes).
3. If you find dust blocking the holes it is recommended to clean the fan unit and remove the dust from the front and rear panels of the switch using a vacuum cleaner.
4. Remove and reinstall the fan unit of the spine. Make sure the mating connector of the new unit is free of any dirt and/or obstacles. See Section 5.4 on page 55.



Replace defective spine fan modules as soon as they are identified.

8.4 Spine Board

The yellow LED on the Spine board is lit:

1. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules and ventilation holes are not blocked (especially dust over the holes).
2. If you find dust blocking the holes it is recommended to clean the fan unit and remove the dust from the front and rear panels of the switch using a vacuum cleaner.
3. Remove and reinstall the spine board. Make sure the mating connectors of the unit is free of any dirt and/or obstacles. See Section 5.3 on page 53.
4. Make sure that the spine and the Leafs both have the same version of FW.
5. Reburn the FW and remove and reinstall the spine.
6. Replace the spine board.

8.5 FabricIT SW

8.5.1 The last software update did not succeed:

1. Connect the RS232 connector (CONSOLE) to a laptop.
2. Push the reset button on the switch or management module.
3. You will have ~ 5 seconds to stop the U-Boot by pressing Control-B.
4. Choose the image to upload. Only use image 1 or image 2.

U-Boot 2009.01-mlnx1.4 (May 12 2010 - 14:08:15)

```
CPU:  AMCC PowerPC 460EX Rev. A at 1000 MHz (PLB=200, OPB=100, EBC=100 MHz)
      Security/Kasumi support
      Bootstrap Option H - Boot ROM Location I2C (Addr 0x52)
      Internal PCI arbiter disabled
      32 kB I-Cache 32 kB D-Cache
Board: Mellanox PPC460EX Board
FDEF: No
I2C:  ready
DRAM:  2 GB (ECC enabled, 400 MHz, CL3)
FLASH: 16 MB
NAND:  1024 MiB
PCI:   Bus Dev VenId DevId Class Int
PCIE0: link is not up.
PCIE1: successfully set as root-complex
      01 00 15b3 bd34 0c06 00
Net:   ppc_4xx_eth0, ppc_4xx_eth1
Hit Ctrl+B to stop autoboot:  0
```

Mellanox FabricIT

Boot Menu:

1. EFM_PPC_M460EX EFM_1.1.1000 2010-06-24 16:32:03 ppc
 2. EFM_PPC_M460EX EFM_1.1.1200 2010-06-25 18 :00:03 ppc
 3. U-Boot prompt
- Choice:

5. Select the image to boot.

Appendix A: Specification Data

A.1 Certifications and Statements

Table 12 - Switch Specification Sheet IS5100

Physical		Power and Environmental	
H x W x D:	10.43" x 19" x 27" inches 265 mm x 482.6mm x 685 mm The shelf adds 44.5mm to the height	Input Voltage:	90-264 VAC, 50-60Hz, 13A@100V 6.3A@240V
Weight:	61.8 kg (136 lbs.) minimum configuration 77 kg (170 lbs.) full configuration 32 kg (71 lbs) empty configuration	Temperature:	10 to 45 Celsius
Mounting:	19" Rack mount (EIA-310)	Max Heat Output:	5,172.1 BTUs/hr
SerDes Speeds:	20 and 40 Gb/s per port	Humidity:	10% - 90% non-condensing
Connector Types:	QSFP	Power Consumption per Leaf:	Typical: 82.28W (not including QSFP power) Max: 89.745W (not including QSFP power)
Center of Gravity CoGh:	115.58 (mm from bottom of chassis)	Power Consumption per Spine:	Typical: 102.86W (include 2 Fans) Max: 110.32W (include 2 Fans)
CoGw:	227.2 (mm from left side surface)	Power Consumption for Active cables QSFP:	2.0W Power level #2
CoGd:	338.09 (mm from port end surface) Measured from the bottom left corner as one faces the switch ports.	IS5100	108 ports
		Power consumption full chassis:	Typical: 1333.27W (including QSFP at 2W) Typical: 1225.27W (including QSFP at 1W) Typical: 1056.81W (passive cables) Max: 1515.79W (including QSFP at 2W)

Table 12 - Switch Specification Sheet IS5100

Physical		Power and Environmental	
Protocol Support		Regulatory Compliance	
InfiniBand:	Auto-Negotiation of (20Gb/s, 40Gb/s) 8 InfiniBand Virtual Lanes for all ports	Safety:	US/Canada: cTUVus EU: IEC60950 International: CB
QoS:	Baseboard, Performance, and Device management Agents for full InfiniBand In-Band Management	EMC:	USA: FCC, Class A Canada: ICES, Class A EU: EN55022, Class A EU: EN55024, Class A EU: EN61000-3-2, Class A EU: EN61000-3-3, Class A Japan: VCCI, Class A
Management:		ENVIRONMENTAL:	EU: IEC 60068-2-64: Random Vibration EU: IEC 60068-2-29: Shocks, Type I / II EU: IEC 60068-2-32: Fall Test
		ACOUSTIC:	ISO 7779 ETS 300 753
Scalability and Performance		Replaceable Parts	
Switching Performance:	Simultaneous wire-speed any port to any port	leaves	Up to 6 leaves; 18-ports each
Addressing:	48K Unicast Addresses Max. per Subnet 16K Multicast Addresses per Subnet	Power Supplies	3 Power Supplies standard one of which is a redundant power supply
Switching Capacity	8.6 Tb/s	Leaf Fan Modules	4 Leaf Fan Modules
		Spine Fan Modules	3 Spine Fan Modules with 2 integral fans per module
		Spines	3
		Management Modules	2 available 1 required for operation

Table 34 lists the approved certification status per chassis in different regions of the world

Table 13 - Certifications

TPN	FCC	VCCI	EN	ICES	CE	CB	cTUVus	KCC	C-TICK	CCC	GOST-R	S-MARK
MIS5100Q-3DNC	YES	YES	YES	YES	YES	YES	YES	YES	YES	exemption	YES	YES

A.2 EMC Statements (USA)

A.2.1 FCC Statements (USA)

Class A Statements:

§ 15.19(a)(4)

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

§ 15.21

Statement

Warning!

Changes or modifications to this equipment not expressly approved by the party responsible for compliance (Mellanox Technologies) could void the user's authority to operate the equipment.

§15.105(a)

Statement

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

A.2.2 EN Statements (Europe)

EN55022 Class A Statement:

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

A.2.3 ICES Statements (Canada)

Class A Statement:

"This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada."

A.2.4 VCCI Statements (Japan)

Class A Statement:

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI-A

(Translation - "This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.")

A.2.5 KCC Certification (Korea)

English Translation

Device	User's information
A급 기기 (업무용 방송통신기기)	이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.
CLASS A device (commercial broadcasting and communication equipment)	This device has been approved by EMC registration. Distributors or users pay attention to this point. This device is usually aimed to be used in other area except at home.
● Remark	
Class A device: operated in a commercial area.	

Appendix B: Calculating the Weight of a Customized Chassis

The weight of a customized chassis can be calculated for any possible customization as follows.

Take the weight of a chassis with:

- all spines
- all leaf fan modules
- 0 leafs
- 0 leaf blanks
- all power supplies
- 1 management modules

The weight of the IS5100 chassis configured above is 54.7kg.

To this add:

$(\# \text{ of leafs} * 2.76) + ((\# \text{ of leaf blanks}) * 0.764) + 3.15$ (if you will have two management modules)
+ 1.15 (if you will have only one management module) = weight of the chassis plus the leaf boards, PSUs, and Management modules installed in the chassis.

Appendix C: Calculating the Power of a Customized Chassis

To calculate the power consumption of a customized chassis take the base power and add the power of the fans, spines, management modules, and leafs.

Table 14 - Power Consumption of Chassis Parts

Part	typ power passive cables	typ power active cables @ 2W per port
IB QDR leaf	82.28W	121.45
Spine	103W	Not applicable
Fan	14	Not applicable
Management Module	20	Not applicable

The base power consumption of the chassis (including full power supplies) with 0 fans, 0 spines, 0 management modules), and 0 leafs is 254.55W.

To calculate the chassis power:

$254.55W + (103W * \# \text{ of spines}) + (20W * \# \text{ of management modules}) + (14W * \# \text{ of fans}) + (82.28W * \# \text{ of leafs for passive cables})$ **or** $(121.45W * \# \text{ of leafs for active cables})$.

Appendix D: QSFP Interface

20	GND	GND	19
21	Rx2n	Rx1n	18
22	Rx2p	Rx1p	17
23	GND	GND	16
24	Rx4n	Rx3n	15
25	Rx4p	Rx3p	14
26	GND	GND	13
27	ModPrsL	SDA	12
28	IntL	SCL	11
29	VccTx	Vcc Rx	10
30	Vcc1	ResetL	9
31	LPMode	ModSelL	8
32	GND	GND	7
33	Tx3p	Tx4p	6
34	Tx3n	Tx4n	5
35	GND	GND	4
36	Tx1p	Tx2p	3
37	Tx1n	Tx2n	2
38	GND	GND	1

Table 15 - InfiniBand QSFP Connector Pinout

Connector Pin Number	Connector Pin Name	Signal Description
1	GND	Ground
2	Tx2n	Transmitter Inverted Data Input
3	Tx2p	Transmitter Non-Inverted Data Input
4	GND	Ground
5	Tx4n	Transmitter Inverted Data Input
6	Tx4p	Transmitter Non-Inverted Data Input
7	GND	Ground
8	ModSelL	Module Select
9	ResetL	Module Reset
10	Vcc Rx	+3.3 V Power supply receiver
11	SCL	2-wire serial interface clock
12	SDA	2-wire serial interface data
13	GND	Ground
14	Rx3p	Receiver Non-Inverted Data Output
15	Rx3n	Receiver Inverted Data Output
16	GND	Ground
17	Rx1p	Receiver Non-Inverted Data Output
18	Rx1n	Receiver Inverted Data Output
19	GND	Ground
20	GND	Ground
21	Rx2n	Receiver Inverted Data Output 3
22	Rx2p	Receiver Non-Inverted Data Output 3
23	GND	Ground
24	Rx4n	Receiver Inverted Data Output 3
25	Rx4p	Receiver Non-Inverted Data Output 3
26	GND	Ground
27	ModPrsL	Module Present
28	IntL	Interrupt
29	Vcc Tx	+3.3 V Power supply transmitter
30	Vcc 1	+3.3 V Power Supply
31	LPMode	Low Power Mode
32	GND	Ground
33	Tx3p	Transmitter Non-Inverted Data Input
34	Tx3n	Transmitter Inverted Data Input
35	GND	Ground
36	Tx1p	Transmitter Non-Inverted Data Input
37	Tx1n	Transmitter Inverted Data Input
38	GND	Ground

Diagram illustrating the 10-pin connector pinout for the TSC2040 module, showing two views: View into Front of Cage and View into Rear of Connector.

View into Front of Cage:

- Pin 1: GND
- Pin 2: TX1n
- Pin 3: TX1p
- Pin 4: TX2n
- Pin 5: TX2p
- Pin 6: TX3n
- Pin 7: TX3p
- Pin 8: TX4n
- Pin 9: TX4p
- Pin 10: GND
- Pin 11: GND
- Pin 12: RX1n
- Pin 13: RX1p
- Pin 14: RX2n
- Pin 15: RX2p
- Pin 16: RX3n
- Pin 17: RX3p
- Pin 18: RX4n
- Pin 19: RX4p
- Pin 20: GND

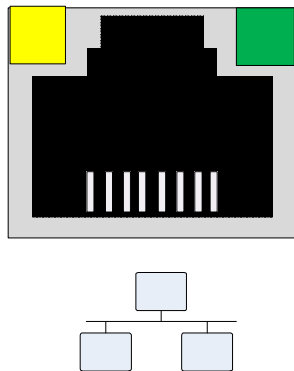
View into Rear of Connector:

- Pin 1: GND
- Pin 2: TX1n
- Pin 3: TX1p
- Pin 4: TX2n
- Pin 5: TX2p
- Pin 6: TX3n
- Pin 7: TX3p
- Pin 8: TX4n
- Pin 9: TX4p
- Pin 10: GND
- Pin 11: GND
- Pin 12: RX1n
- Pin 13: RX1p
- Pin 14: RX2n
- Pin 15: RX2p
- Pin 16: RX3n
- Pin 17: RX3p
- Pin 18: RX4n
- Pin 19: RX4p
- Pin 20: GND

Dimensions: 18.35mm (Top), 8.50mm (Bottom).

Appendix E: Ethernet RJ 45 Connector

Figure 47: Ethernet RJ45 Connector



Appendix F: Replacement Parts Ordering Numbers

Table 16 - Replacement Parts Ordering Numbers

Part Description	OPN
Power supply unit PSU	MTP005001
Power supply blank	MTM005001
Leaf board unit 18 port QDR	MIS5001QC
Leaf Thermal blank	MTM005004
Spine board unit for QDR Switch system	MIS5002QC
Spine board blank	MTM005002
PPC460 Management Module	MIS5600MDC
Management module blank	MTM005003
Fan unit for leafs	MTF005004
Fan unit for spines	MTF005003
DB9 to RJ45 Harness	HAR000028
Power cord 250v 15a 2.0M C14 to C13	ACC000242
Power cord Type B for USA, Canada, Mexico, Taiwan	ACC000204
Power cord Type H for Israel	ACC000205
Power cord Type E/F for Sweden, France, Germany, Netherlands, Russia	ACC000207
Power cord Type G for UK	ACC000208
Power cord Type D for India	ACC000209
Power cord Type I for China	ACC000210
Power cord Type J for Switzerland	ACC000211
Power cord Type B for Japan	ACC000212
Power cord Type I for Australia	ACC000213

Appendix G: Avertissements de sécurité d'installation (French)

1. Instructions d'installation



Lisez toutes les instructions d'installation avant de brancher le matériel à la source d'alimentation électrique.

2. Température excessive



Ce matériel ne doit pas fonctionner dans une zone avec une température ambiante dépassant le maximum recommandé de 45°C (113°F). Un flux d'air de 200LFM à cette température ambiante maximale est nécessaire. En outre, pour garantir un bon écoulement de l'air, laissez au moins 8 cm (3 pouces) d'espace libre autour des ouvertures de ventilation.

3. Empilage du châssis



Le châssis ne doit pas être empilé sur un autre matériel. Si le châssis tombe, il peut provoquer des blessures corporelles et des dégradations de biens.

4. Connection d'Alimentation électrique excédentaire -dangers électriques



Ce produit comporte un couvercle transparent sur l'espace pour l'alimentation électrique redondante.

Ne pas faire fonctionner le produit si le couvercle transparent n'est pas solidement fixé ou s'il est enlevé.

5. Orages – dangers électriques



Pendant un orage, il ne faut pas utiliser le matériel et il ne faut pas brancher ou débrancher les câbles.

6. Branchement/débranchement des câbles InfiniBand en cuivre



Les câbles InfiniBand en cuivre sont lourds et ne sont pas flexibles, il faut donc faire très attention en les branchant et en les débranchant des connecteurs. Consultez le fabricant des câbles pour connaître les mises en garde et les instructions spéciales.

7. Montage et entretien sur baie



Lorsque ce produit est monté ou entretenu sur baie, il faut prendre des précautions spéciales pour s'assurer que le système reste stable. En général, il faut remplir la baie avec du matériel de bas en haut.

8. Fuite > 3.5mA Leakage > 3.5mA



« ATTENTION – La connexion à la terre des forts courants de fuite est essentielle avant le branchement de l'alimentation. »

Avant de brancher l'appareil à la conduite d'alimentation, les vis de protection à la terre du terminal de l'appareil doivent être appliquées à l'installation de protection à la Terre du bâtiment.

9. Forts Courants de Fuite High Leakage Current



Attention: Forts courants de fuite. Il est essentiel de relier à la terre avant de brancher l'alimentation.

10. Ajouter une information de connexion à la masse Connect a Valid Ground to this Device



Avant de brancher l'appareil à la conduite d'alimentation, les vis de protection à la terre du terminal de l'appareil doivent être appliquées à l'installation de protection à la Terre du bâtiment.

11. Installation du matériel



Ce matériel ne doit être installé, remplacé ou entretenu que par du personnel formé et qualifié.

12. Elimination du matériel



L'élimination de ce matériel doit s'effectuer dans le respect de toutes les législations et réglementations nationales en vigueur.

13. Codes électriques locaux et nationaux



Ce matériel doit être installé dans le respect des codes électriques locaux et nationaux.

14. Codes d'installation



L'appareil doit être installé selon l'ancienne version des codes électriques nationaux du pays. Pour l'Amérique du Nord, l'équipement doit être installé conformément aux spécifications du Code Electrique National Américain et du Code Electrique Canadien.

15. Interconnexion des unités



Les câbles de branchement à l'unité RS232 et les interfaces Ethernet doivent être certifiés UL de type DP-1 ou DP-2. (Note - lorsqu'il existe dans un circuit non LPS)

Protection contre la surintensité : Un appareil de protection répertorié facilement accessible contre la surintensité du circuit de branchement et calibré à 20A doit être incorporé dans le câblage électrique du bâtiment.

16. Exposition au rayonnement grave



Mise en garde – l'utilisation de commandes ou de réglages ou l'exécution de procédures autres que ce qui est spécifié dans les présentes peut engendrer une exposition au rayonnement grave.



PRODUIT LASER DE CLASSE 1 » et références aux normes laser les plus récentes CEI 60 825-1:1993 + A1:1997 + A2:2001 et NE 60825-1:1994+A1:1996+ A2:2001

17. S'assurer que les enceintes sont appropriées



Des enceintes électriques, mécaniques et incendie adaptées doivent être fournies par le fabricant du produit final ou par l'utilisateur final.

18. Cordons électriques CA homologués UL

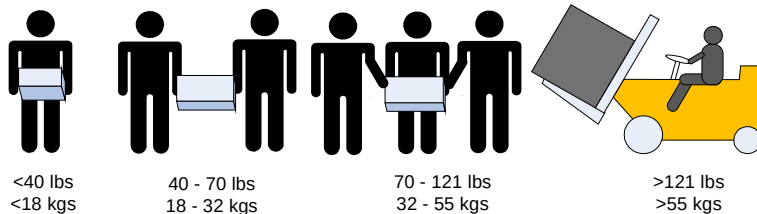


Pour les prises électriques en Amérique du Nord, choisissez un cordon électrique homologué UL et certifié CSA

à 3 conducteurs, [18 AWG], terminé par une fiche moulée, d'une tension nominale de 125 V, [15 A], avec une longueur minimale de 1,5 m [6 pieds] et d'une longueur maximale de 4,5 m [18 pieds]

Pour les prises électriques en Europe, choisissez un cordon électrique harmonisé internationalement et marqué "<HAR>",

à 3 conducteurs, d'un diamètre de fil minimum de 0,75 mm², d'une tension nominale de 300 V, avec une gaine isolée en PVC. Le cordon doit avoir une fiche moulée d'une tension nominale de 250 V et d'une intensité nominale de 10 A.



Anhang H: Installation - Sicherheitshinweise (German)

1. Installationsanleitungen



Lesen Sie alle Installationsanleitungen, bevor Sie das Gerät an die Stromversorgung anschließen.

2. Übertemperatur



Dieses Gerät sollte nicht in einem Bereich mit einer Umgebungstemperatur über der maximal empfohlenen Temperatur von 45°C (113°F) betrieben werden. Es ist ein Luftstrom von 200 LFM bei maximaler Umgebungstemperatur erforderlich. Außerdem sollten mindestens 8 cm (3 in.) Freiraum um die Belüftungsöffnungen sein, um einen einwandfreien Luftstrom zu gewährleisten.

3. Stapeln des Chassis



Das Chassis sollte nicht auf andere Geräte gestapelt werden. Wenn das Chassis herunterfällt, kann es zu Verletzungen und Beschädigungen an Geräten führen.

4. Redundanter Stromversorgungsanschluss - Elektrische Gefahr



Dieses Produkt verfügt über eine Abdeckung über dem Bereich für die redundante Stromversorgung. Betreiben Sie das Produkt nicht, wenn diese Abdeckung nicht sicher fest sitzt oder entfernt wurde.

5. Bei Gewitter - Elektrische Gefahr



Arbeiten Sie während eines Gewitters und Blitzschlag nicht am Gerät, schließen Sie keine Kabel an oder ab.

6. Anschließen/Trennen von InfiniBand-Kupferkabel



InfiniBand-Kupferkabel sind schwer und nicht flexible. Deshalb müssen sie vorsichtig an die Anschlüsse angebracht bzw. davon getrennt werden. Lesen Sie die speziellen Warnungen und Anleitungen des Kabelherstellers.

7. Rack-Montage und Wartung



Wenn dieses Produkt in einem Rack montiert oder gewartet wird, sind besondere Vorichtsmaßnahmen zu ergreifen, um die Stabilität des Systems zu gewährleisten. Im Allgemeinen sollten Sie das Gestell von unten nach oben mit Geräten füllen.

8. Geräteinstallation



Dieses Gerät sollte nur von geschultem und qualifiziertem Personal installiert, ausgetauscht oder gewartet werden.

9. Geräteentsorgung



Die Entsorgung dieses Geräts sollte unter Beachtung aller nationalen Gesetze Bestimmungen erfolgen.

10. Regionale und nationale elektrische Bestimmungen



Dieses Gerät sollte unter Beachtung der regionalen und nationalen elektrischen Bestimmungen installiert werden.

11. Richtigen Schutz sicherstellen



Geeigneter elektrischer, mechanischer und Feuerschutz sind vom Hersteller des Endprodukts oder dem Endbenutzer bereitzustellen.

12. Strahlenkontakt



Achtung – Nutzung von Steuerungen oder Einstellungen oder Ausführung von Prozeduren, die hier nicht spezifiziert sind, kann zu gefährlichem Strahlenkontakt führen..



Klasse 1 Laserprodukt und Referenzen zu den aktuellsten Lasterstandards :
ICE 60 825-1:1993 + A1:1997 + A2:2001 und EN 60825-1:1994+A1:1996+ A2:2001

13. UL-und CSA Certified Netzkabel UL Listed and CSA Certified Power Supply Cord



Für Nordamerika Stromanschluss, wählen Sie ein Netzkabel, das UL-und CSA Certified

3 - Leiter, [18 AWG], mit einem angespritztem Stecker bewertet bei 125 V, [15], mit einer Mindestlänge von 1,5 m [Six Feet] aber nicht mehr als 4,5 m.

Für die europäischen Zusammenhang, wählen Sie ein Netzkabel, das international harmonisiert und der Aufschrift "<HAR>",

3 - Leiter, mindestens 0,75 mm² Draht, bewertet mit 300 V, mit einem PVC-Mantel isoliert. Das Kabel muss eine angespritztem Stecker bewertet bei 250 V, 10 A. "

14. Ableitstrom > 3.5mA LEAKAGE >3.5mA

WARNUNG: Hohe Ableitstrom; Earth Verbindung, bevor Sie die Verbindung von wesentlicher Bedeutung werden.

15. Add GND Verbindung Informationen Add GND connection information

Bevor Sie dieses Gerät an das Stromnetz, die Schutz Erde Terminal Schrauben dieses Gerät muss an den Schutzleiter in der Gebäudeinstallation.

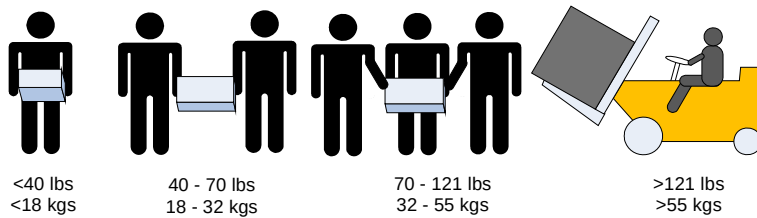
16. INSTALLATION CODES INSTALLATION CODES

Dieses Gerät muss installiert sein, entsprechend auf die neueste Version des Landes National Electrical Code. Für Nordamerika, müssen in Übereinstimmung mit den geltenden Vorschriften in der US-amerikanischen National Electrical Code und dem Canadian Electrical Code.

17. Zusammenschaltung von EINHEITEN INTERCONNECTION OF UNITS

Kabel für den Anschluss an das Gerät RS232- und Ethernet-Schnittstellen müssen UL zertifiziert Typ DP-1 oder DP-2. (Hinweis-, wenn nicht mit Wohnsitz in LPS-Schaltung)

Überstromschutz: Eine leicht zugängliche Auflistung Abzwegleitung Überstrom-Schutzeinrichtung 20 A bewertet werden müssen in dem Gebäude Verkabelung.



Appendix I: Advertencias de seguridad para la instalación (Spanish)

1. Instrucciones de instalación



Antes de conectar el equipo a la fuente de alimentación, leer todas las instrucciones de instalación.

2. Lesión corporal por peso



Dado que el equipo es muy pesado, se debe mover únicamente mediante un elevador mecánico, para evitar lesiones.

3. Instalación en un lugar con acceso restringido.



Esta unidad ha sido ideada para instalar en lugares de acceso restringido.

4. Sobrecalentamiento



No se debe utilizar el equipo en un área con una temperatura ambiente superior a la máxima recomendada: 45°C (113°F). Además, para garantizar una circulación de aire adecuada, se debe dejar como mínimo un espacio de 8 cm (3 pulgadas) alrededor de las aberturas de ventilación.

5. Apilamiento del chasis



Los chasis no se deben apilar sobre otros equipos. La caída del chasis podría causar lesiones corporales, así como daños al equipo.

6. Conexión de fuente de alimentación redundante: peligro de descarga eléctrica



Este producto incluye una fuente de alimentación redundante o, en su lugar, una vacía. Si se dispone de una fuente de alimentación vacía, no utilizar el producto si su tapa está quitada o no está bien cerrada.

7. Cuando hay rayos: peligro de descarga eléctrica



No utilizar el equipo ni conectar o desconectar cables durante períodos de actividad de rayos.

8. Conexión y desconexión del cable Copper InfiniBand



Dado que los cables de cobre InfiniBand son pesados y no son flexibles, su conexión a los conectores y su desconexión se deben efectuar con mucho cuidado. Para ver advertencias o instrucciones especiales, consultar al fabricante del cable.

9. Montaje y mantenimiento de bastidores



Al instalar o realizar el mantenimiento de este aparato en un bastidor, es preciso adoptar precauciones especiales para garantizar que el sistema se mantenga estable. En general, en un bastidor, los equipos se deben instalar comenzando desde abajo hacia arriba.

10. Instalación de equipos



La instalación, el reemplazo y el mantenimiento de este equipo estarán a cargo únicamente de personal capacitado y competente.

11. Asegurar confinamientos adecuados



El fabricante del producto final o el usuario final deberán suministrar un confinamiento adecuado para componentes eléctricos y mecánicos y contra incendio.

12. Eliminación de equipos



La eliminación definitiva de este equipo se debe efectuar conforme a todas las leyes y reglamentaciones nacionales.

13. Códigos eléctricos locales y nacionales



Este equipo se debe instalar conforme a los códigos eléctricos locales y nacionales.

14. Cable de alimentación homologado por UL y con certificación CSA



En conexiones de América del Norte, seleccionar un cable de alimentación homologado por UL y con certificación CSA de tres conductores, [16 AWG], terminado en un enchufe moldeado con capuchón de 125 voltios nominal, [13 A], con una longitud mínima de 1,5 metros, pero no más de 4,5 metros.

En conexiones europeas, seleccionar un cable de alimentación armonizado internacionalmente y marcado "<HAR>", de tres conductores, hilo de 1,0 mm² como mínimo, 300 voltios nominal, con cobertura protectora aislante de PVC. El cable debe tener un enchufe moldeado con capuchón de 250 voltios nominal, 10 A.

15. Fuga > 3,5 mA



ADVERTENCIA: Alta corriente de fuga. Es esencial efectuar la conexión a tierra antes de conectar la alimentación.

16. Añadir conexión a tierra



Antes de conectar el dispositivo a la línea de alimentación, los tornillos del terminal de la puesta a tierra de protección del dispositivo se deben conectar a la puesta a tierra de protección de la instalación del edificio.

(Información de conexión a tierra):

La instalación del edificio deberá proveer un medio para la conexión con la puesta a tierra de protección y un técnico de servicio deberá conectar permanentemente el equipo a dicho medio de conexión.

Un TÉCNICO DE SERVICIO comprobará si la toma eléctrica de la que se suministrará corriente al equipo provee una conexión con la puesta a tierra de protección del edificio. De no ser así, el TÉCNICO DE SERVICIO se encargará de instalar un CONDUCTOR DE CONEXIÓN A TIERRA DE PROTECCIÓN, del terminal de puesta a tierra de protección separado al conductor de tierra de protección del edificio. El equipo se instalará en un área donde haya conexión equipotencial, como por ejemplo, un centro de telecomunicaciones o una sala de computadoras dedicada.

17. Códigos de instalación



Este dispositivo se debe instalar conforme a la versión más reciente de los códigos eléctricos nacionales del país en cuestión. En América del Norte, el equipo se debe instalar de acuerdo con las disposiciones vigentes del Código Eléctrico Nacional de los EE.UU. y del Código Eléctrico de Canadá.

18. Interconexión de unidades



Los cables para la conexión con las interfaces RS232 y Ethernet de la unidad deben estar homologados por UL tipo DP-1 o DP-2. (Nota: cuando residen en circuito no de tipo LPS)

Protección contra sobrecargas: Al cableado del edificio se debe incorporar un dispositivo de protección contra sobrecargas de circuito derivado, de fácil acceso, con una corriente nominal de 20 A.

19. Exposición a niveles de radiación peligrosos

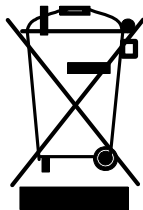


Precaución: el uso de controles o ajustes o la realización de procedimientos distintos de los que aquí se especifican podrían causar exposición a niveles de radiación peligrosos.



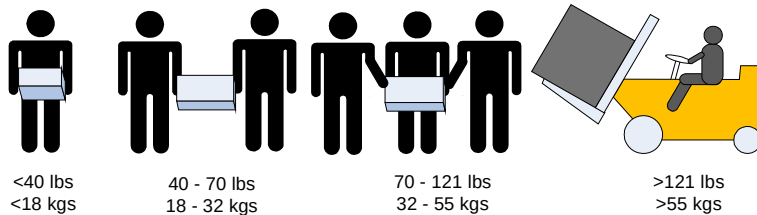
PRODUCTO LÁSER DE CLASE 1 y referencia a las normas de láser más recientes: IEC 60825-1:2007/03 y EN 60825-1:2007

20. Directiva sobre RAEE



Conforme a la Directiva 2002/96/CE sobre RAEE, todos los residuos de equipos eléctricos y electrónicos (EEE) se deben recolectar por separado y no se deben eliminar junto con residuos domésticos.

Al deshacerse de este producto y de todas sus partes, hágalo de una manera responsable y respetuosa con el medio ambiente.





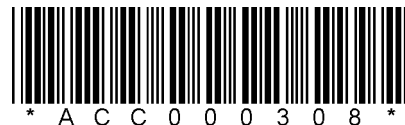
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108Port InfiniBand QDR Switch Platform User Manual

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